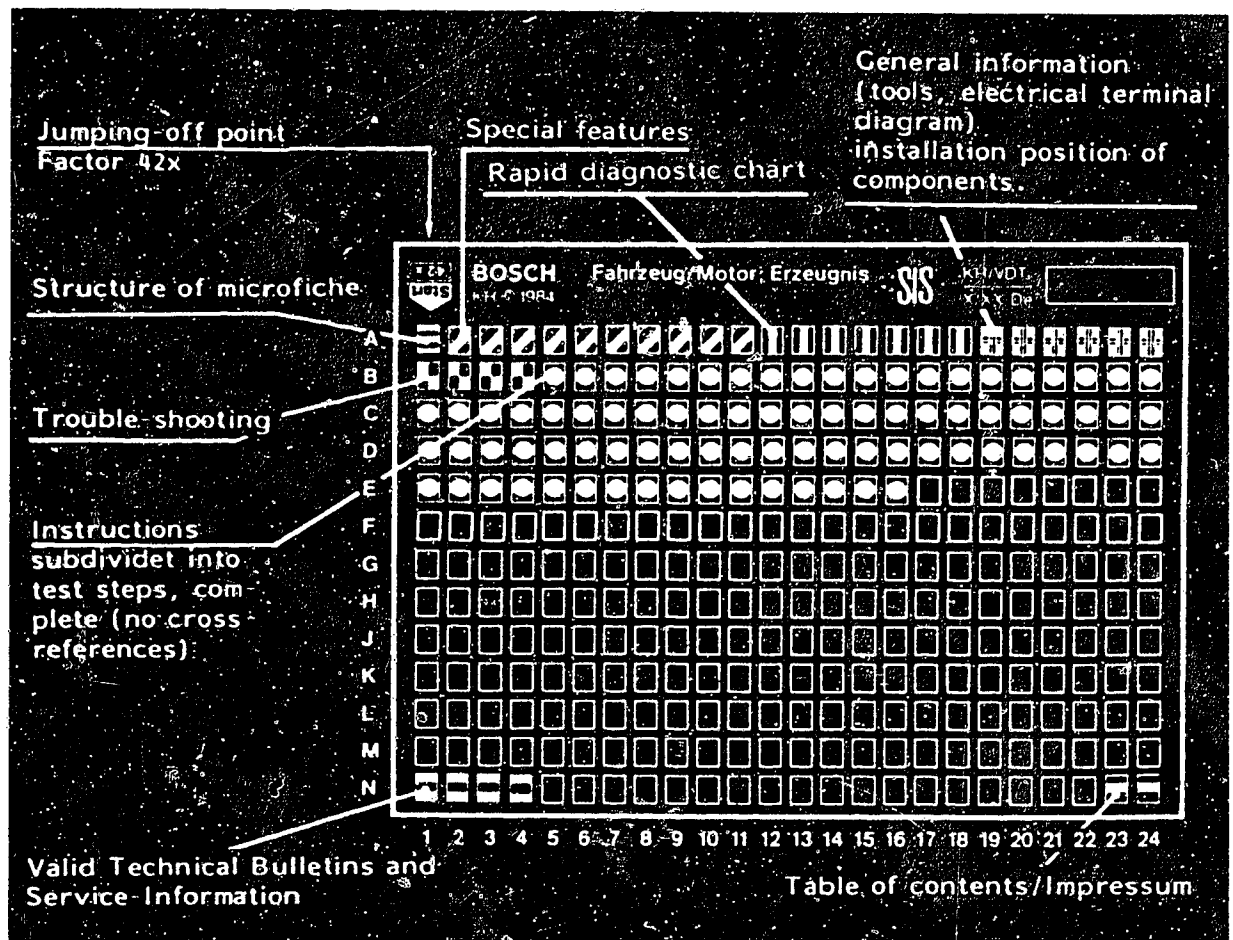


Structure of microfiche



1. Read from left to right
2. Title of microfiche (appears on each coordinate)

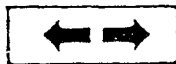
E16	Product/component/test step
	Vehicle/engine

Coordinate

3. Limits of section



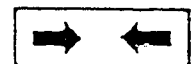
Beginning



Mid-section



End



One-page section

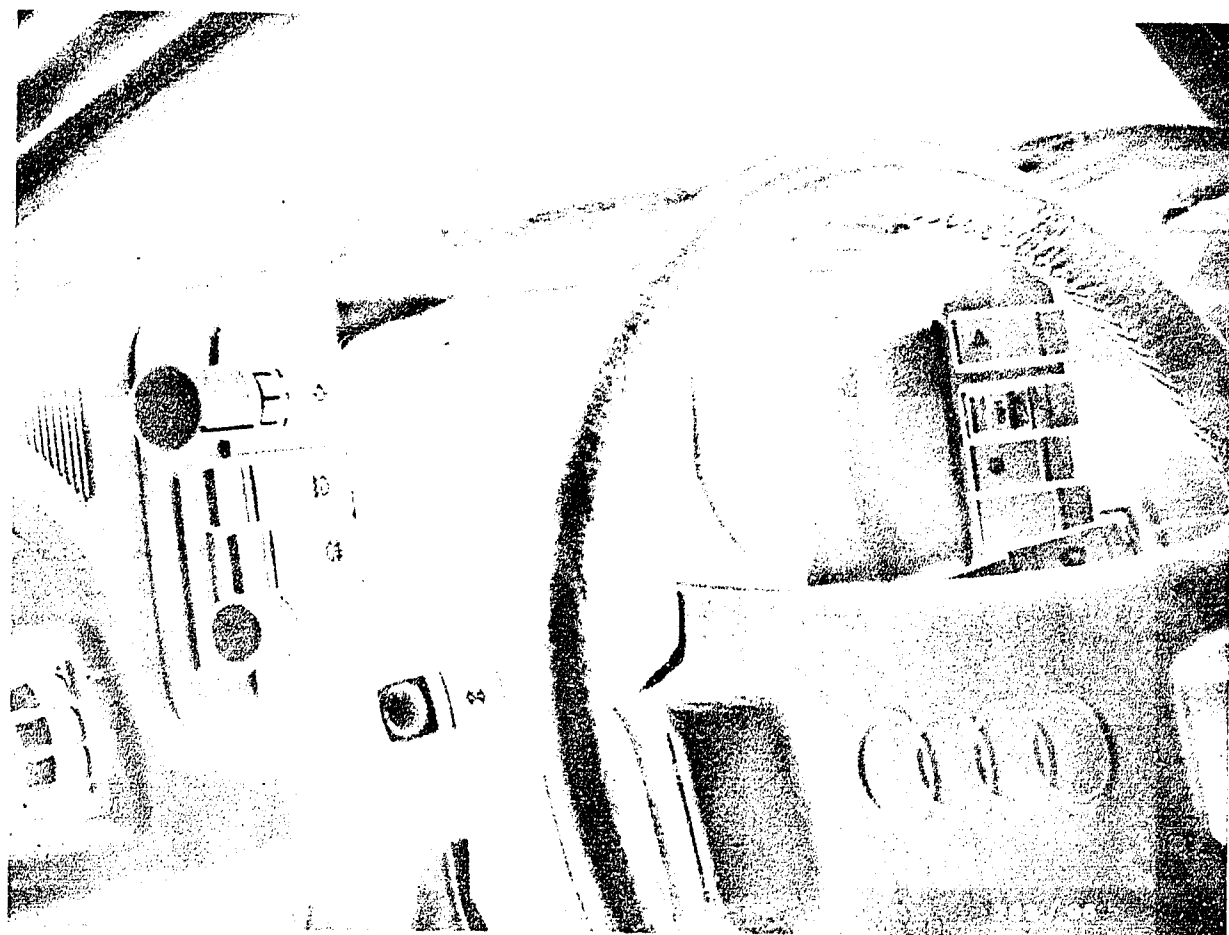
4. Purely vehicle-specific passages in the text are marked with a vertical bar.
5. Reference to relevant working steps in the test specifications, e.g. coordinate C6.

C6

A1

Trouble-shooting program





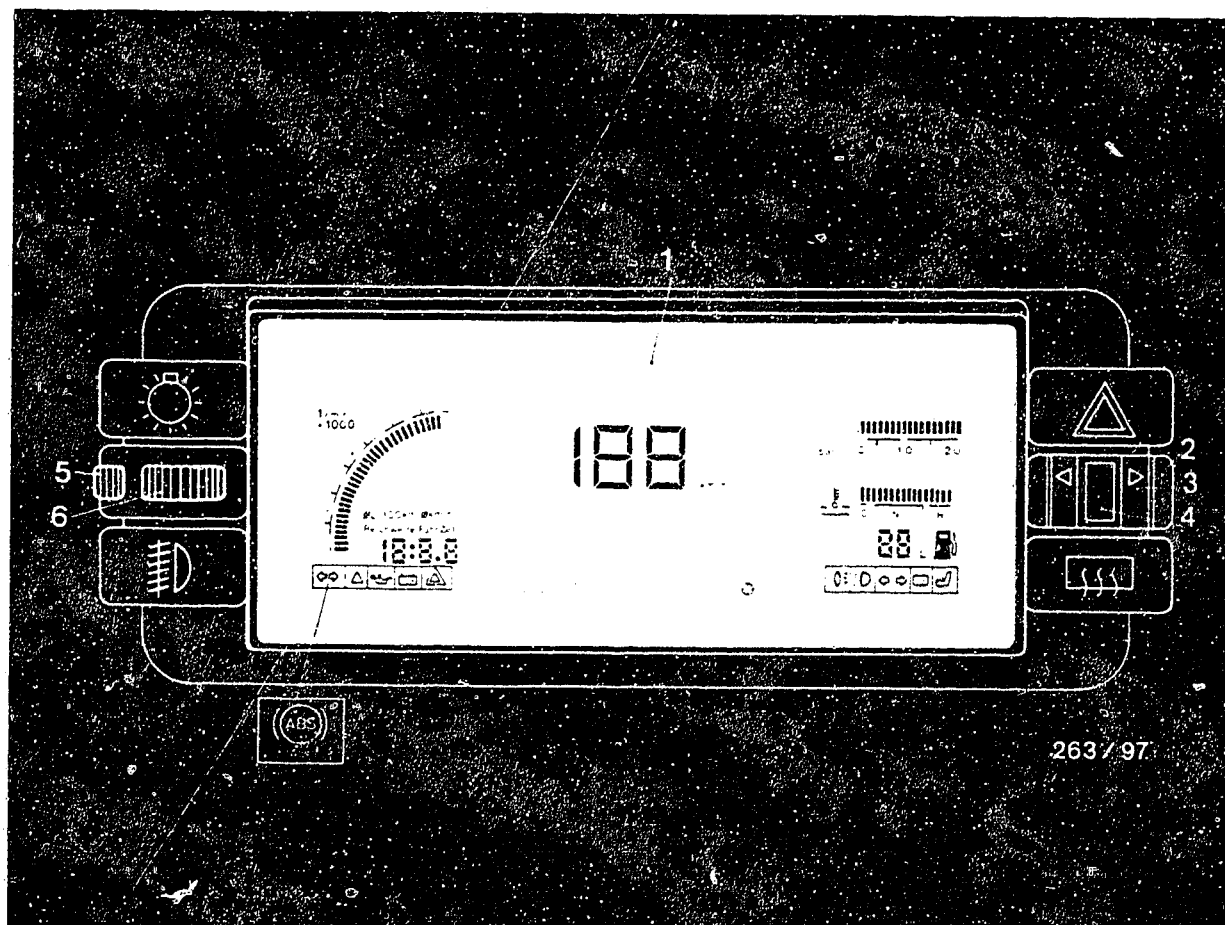
1. Special features

This microfiche card contains the testing and repair instructions with the corresponding test specifications for the fully electronic instrument clusters 0 263 220 001, 002, 005, 006, 007, 008 with an integrated on-board computer.

The instrument cluster has been installed in the Audi Quattro since September, 1982.

One special feature as of August, 1983 is the modified dashboard, which has different operating buttons (see Figure).



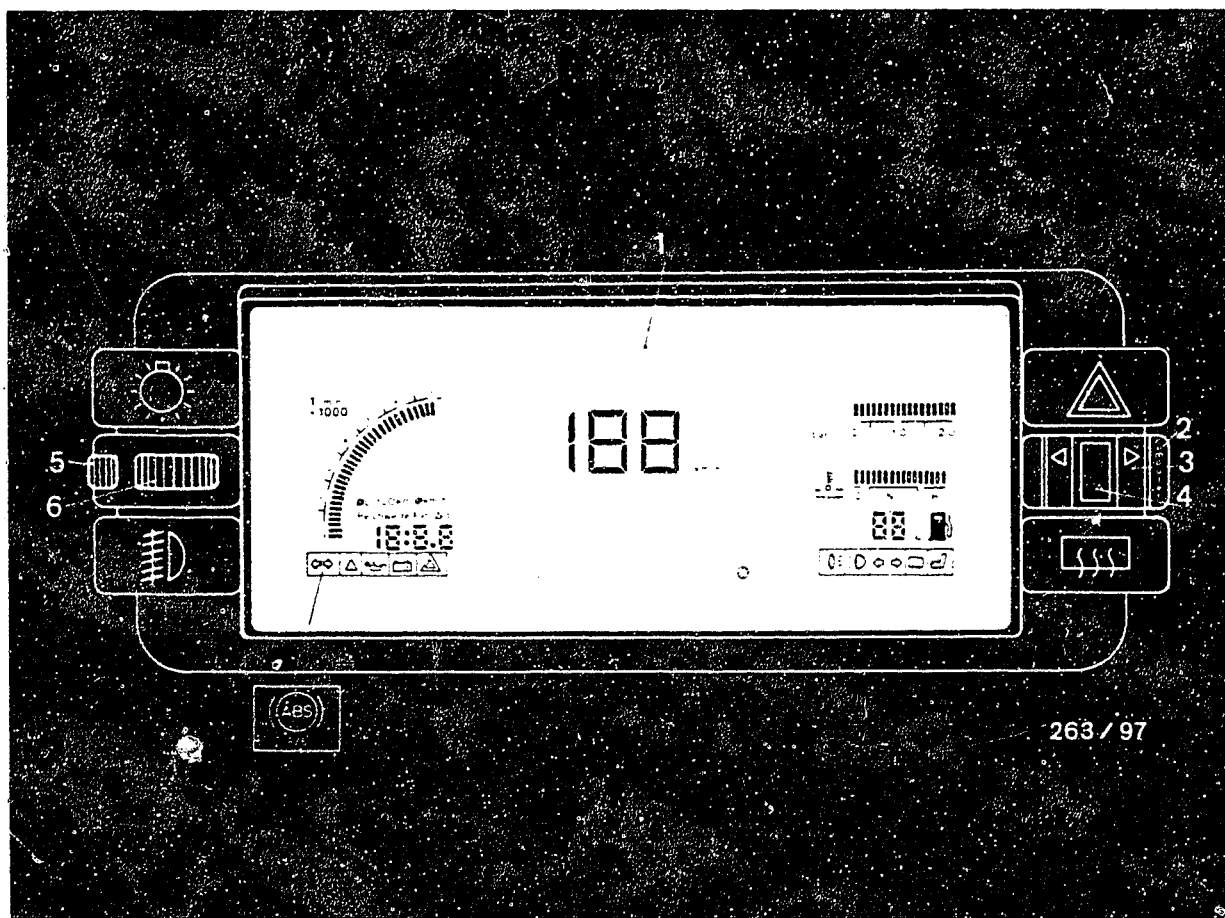


- 1 = VFD instrument cluster
- 2 = Button for on-board computer functions
- 3 = Rocker button
- 4 = Reset button
- 5 = Reduced-display button
- 6 = Brightness control

2. General introduction

As of September 1982, Bosch has been supplying a fully electronic VFD instrument cluster with an integrated on-board computer for the Audi-Quattro (VFD = Vacuum-Fluorescence Display. Operating principle similar to the picture tube of an oscilloscope).





On-board computer: 6 functions are offered.
Indicator lights, in conventional design (bulbs).

Center display area:

Speedometer: 0.5...255 km/h (in the case of instrument clusters 005 and 006, 3...159 miles). Odometer and trip meter: mechanical, driven by stepping motor.

Right-hand display field:

Charge-air pressure gauge: 2 illuminated segments surround the current charge-air pressure of the turbo-charger, the cooling water temperature, and the fuel gauge:

In the case of instrument clusters 001,002,007,008 L, 5...90 ltrs., with less than 10 ltrs. in the tank, the gas pump symbol flashes.

In the case of instrument clusters 005, 006 L, 1...19 gallons, with less than 2 gals. in the tank, the gas pump symbol flashes.

Indicator lights in conventional design (bulbs).

When the ignition is switched on, all electronic displays are automatically energized for 5 seconds. The digital display for the speedometer and for the on-board computer each show a "2" in the first digit for one second, and then a "1".

There are 3 switches on the right and 3 on the left in the outer rim of the instrument cluster. The on-board computer is operated using the center switch on the right.

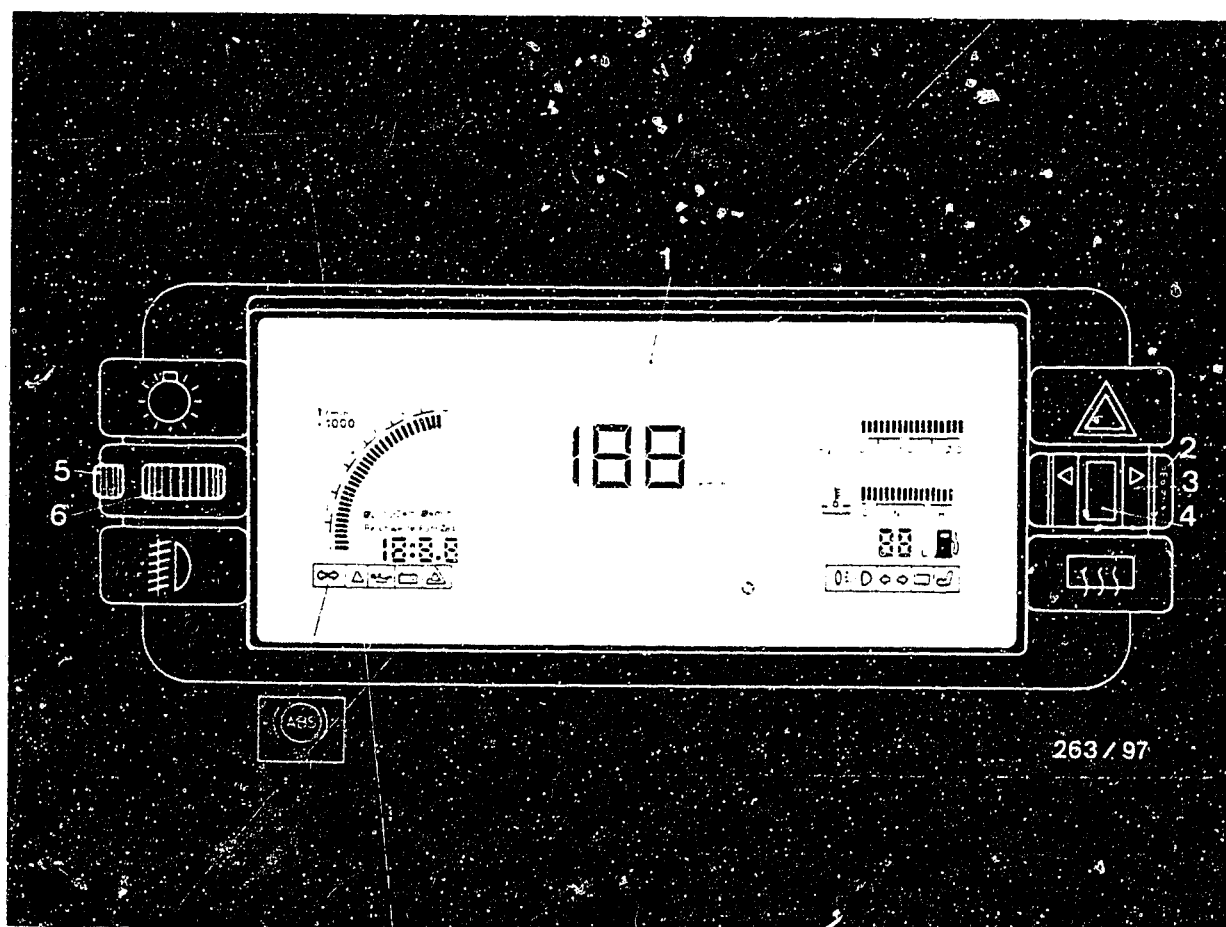


The following on-board computer functions can be called by activating the outer button:

Instrument cluster	001/002 007/008	005, 006
Average fuel consumption	Ø L/100 km	AVE MPG
Current fuel consumption	L/100 km	MPG AVE
Average speed	Ø km/h	MPH
Fuel range (until tank is empty)	km	FUEL RANGE
Elapsed time	(Time)	ELPSD TIME
Time (time of day, 12-hour mode) Set CLOCK (hours)* Set CLOCK (minutes)	(Time)	TIME

* Press the rocker button for at least 3 seconds in order to select this function.

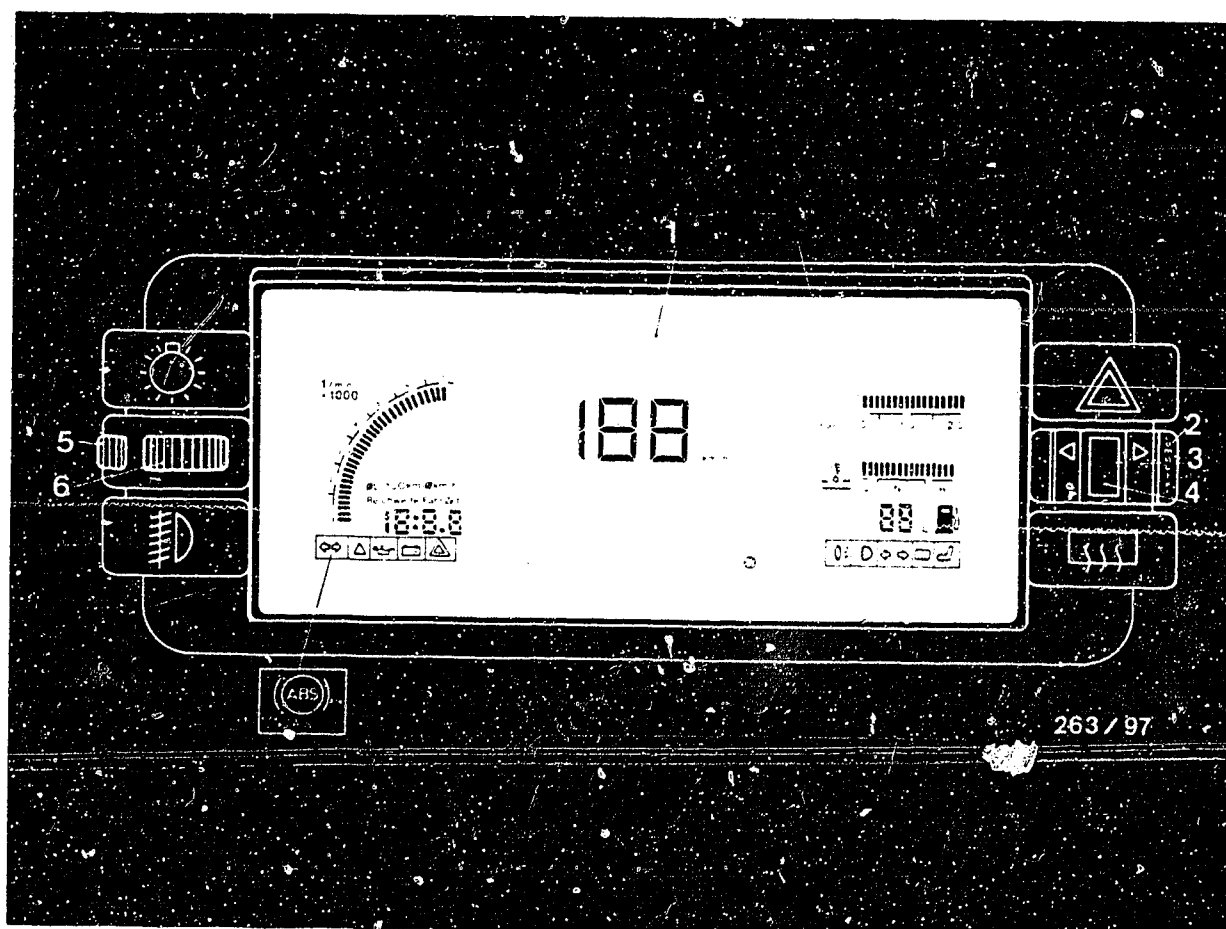




Using the reset button (4) it is possible - only, of course, with the ignition switched on - to reset the on-board computer functions "average fuel consumption"/ "average velocity" and "elapsed time" individually so that the calculation of these functions starts again from the beginning.

With the ignition switched off, the time can be displayed by pressing the reset button (4). At the same time, other portions of the electronic display are also illuminated.

In instrument clusters 005,006,007,008, the ABS light is installed instead of the trailer indicator light.



Button (5) is used to reduce the scope of the display so that only the speedometer and odometer readings are displayed.

The brightness of the display can be varied using the brightness control (knurled thumbwheel) (6).

Warning function:

On reaching a critical value for fuel tank level, coolant temperature, driving range, and driving time, there is an automatic switchover to the full display, with the function in question flashing. (The driving-time warning is intended to remind the driver after 2 hours of driving time that he should take a rest.)

In the case of instrument clusters 005-008, the ABS indicator light is installed instead of the trailer indicator light.



The Audi-Quattro has a check system with a voice synthesizer.

This check system is for monitoring important vehicle functions. Malfunctions are indicated visually and audibly.

Prior to each voiced announcement, the check system warning light comes on.

The malfunction is announced through the left speaker of the car radio. The language is stored in electronic modules (synthetic language, i.e., not from tape or record), and switches on if there is a malfunction.

The owner's manual contains further details.

3. Test instruments

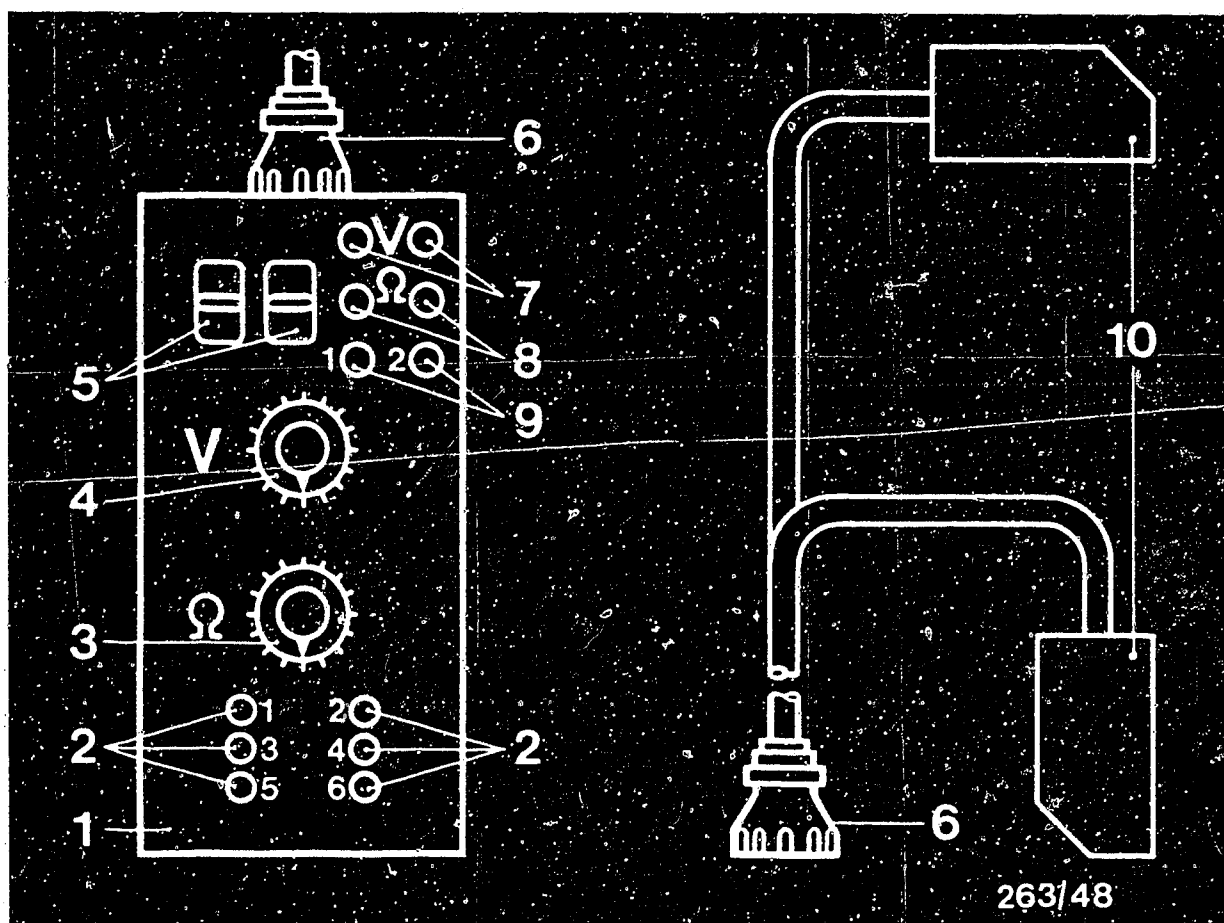
Universal test adapter	0 684 101 801
------------------------	---------------

Adapter lead	KDES 0001
--------------	-----------

Stub shaft made of insulating material
(accessory for system adapter lead)

Multimeter $R_i \geq 20 \text{ k}\Omega$	Commercially available
---	---------------------------





263/48

- 1 = Universal test adapter 0 684 101 801
- 2 = Buttons: simulations
- 3 = Program switch for measurements of resistance
- 4 = Program switch for voltage measurements
- 5 = Test well for special input of the motortester
- 6 = 63-pole plug connection for adapter lead KDES 0001
- 7 = Test sockets for measurement of voltage
- 8 = Test sockets for measurement of resistance
- 9 = Sockets for special functions (Bu 1 to connection 8, Bu 2 to connection 26 of the instrument cluster: power supply when the instrument cluster has been removed from the vehicle - e.g., operation at a test facility)
- 10 = Adapter lead KDES 0001 with 35-pole plug and connector

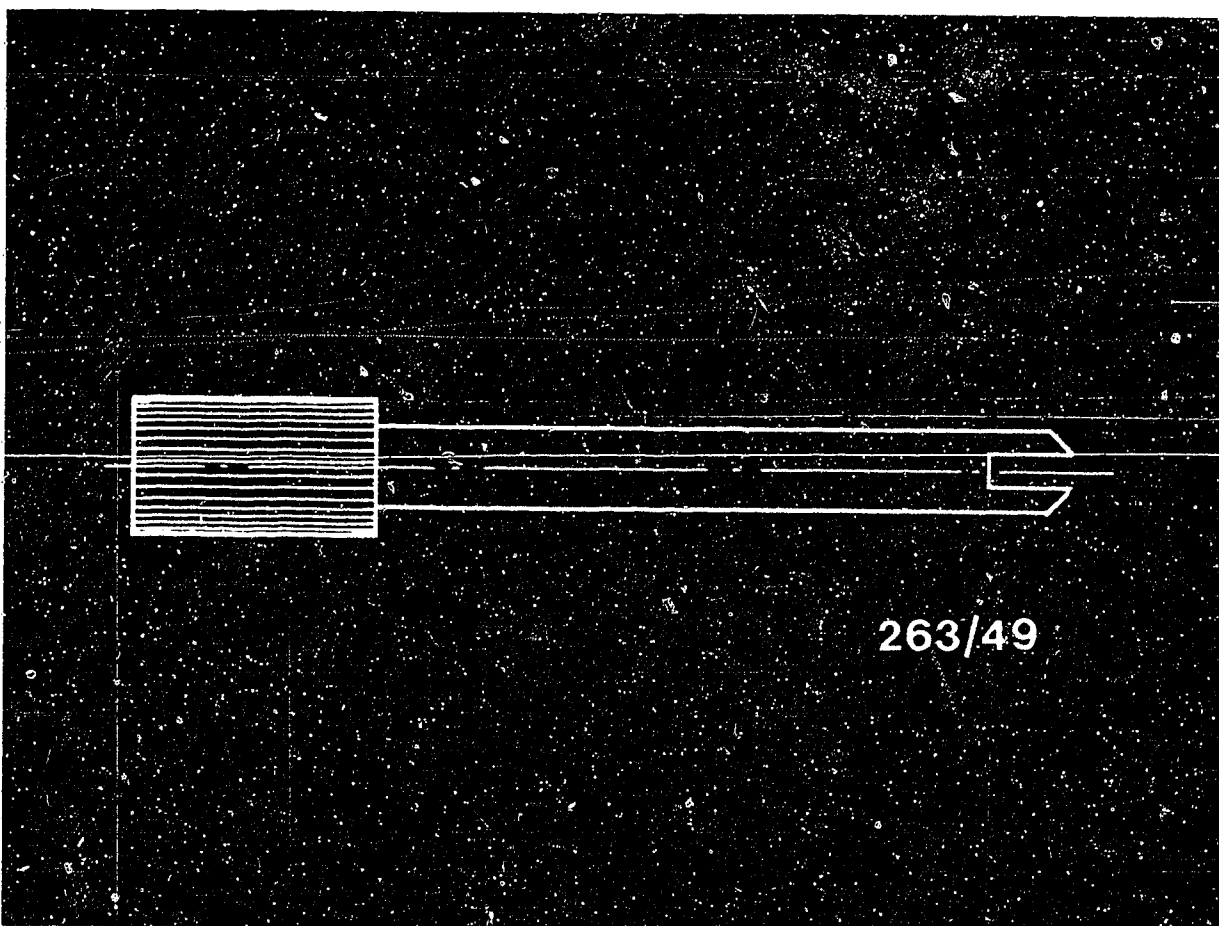
3.1 Universal test adapter with adapter lead KDES 0001

A10

Test instruments

Instrument cluster 0 263 220 ...





3.2 Stub shaft for tank calibration potentiometer

The stub shaft is assembled from two parts:

Part 1: Stub shaft 67 E 749.

Obtain from:

Bürklin

Schillerstrasse 40

D 8000 Munich 2

Grind off the catch lugs on the fork.

Part 2: Positioning knob, Part No. 718 815 A.

Obtain from:

Conrad

Grundstrasse 31

D 8452 Hirschau

Glue the two parts together using fast-setting glue.



4. Rapid diagnostic chart

The rapid diagnostic chart below makes it possible for the experienced technician to check the instrument cluster and the associated sensors and/or sensor signals quickly using normal workshop test equipment.

To do this, the universal test adapter is connected between the instrument cluster and the vehicle wiring harness using the system adapter lead.

This chart contains the following information:

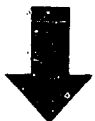






- Sequence of test steps
- Switch or switch setting on the universal test adapter
- Test instructions and test specifications
- Reference to coordinates of the detailed testing and trouble-shooting program in question.
If detailed information and instructions are necessary, proceed in principle according to the trouble-shooting program starting from Coordinates B1.

Before testing, make sure of the following:

- Check the customer complaint. (Check operation of the instrument cluster according to the owner's manual.)
- Is the electrical system (fuses, battery voltage) O.K.?



Rapid diagnostic chart

Test Step	Switch setting V	Q	Explanatory note on testing (All measurements to ground)	Pin on 35-pole plug of the instrument cluster	Test specifications	Coordinates
1		1	Ground test - vehicle ground on the 35-pole plug of the vehicle wiring harness	14	approx. 0 ... 10 Ω	B 20
2		6	Ground test - vehicle ground on the instrument cluster	18	approx. 0 ... 10 Ω	B 22
3		7	Temperature sensor for coolant R ₂₀ = Resistance at 20° C R ₄₀ = Resistance at 40° C R ₆₀ = Resistance at 60° C R ₉₀ = Resistance at 90° C R ₁₂₀ = Resistance at 120° C	35	R ₂₀ = approx. 1 k Ω * R ₄₀ = approx. 500 Ω R ₆₀ = approx. 250 Ω R ₉₀ = approx. 100 Ω R ₁₂₀ = approx. 50 Ω	C 1
4		8	Tank sensor R _{empty} = Resistance with tank empty R _{full} = Resistance with tank full	1	R _{empty} approx. 300 Ω * R _{full} approx. 30 Ω	C 3
5		11	Fuel-consumption sensor ground connection	5	approx. 0 ... 10 Ω	C 5
6		12	Fuel-consumption sensor, resistance	19 → 5	3000 ... 5000 Ω *	C 7
7		13	Fuel-consumption sensor, resistance	34 → 5	500 ... 900 Ω *	C 9
8	1	-	Battery voltage Term. 30 on the instrument cluster	12	approx. 12 V	C 11
9	2	-	Battery voltage Term. 30 on the instrument cluster	29	approx. 12 V	C 13
10	3	-	Voltage from Term. 15, ignition ON	21	approx. 12 V	C 15
11	4	-	Voltage from Term. X, ignition ON	8,9	approx. 12 V	C 17

* Disconnect plug on the instrument cluster!

A13

Rapid diagnostic chart

Instrument cluster 0 263 220 ...



A14

Rapid diagnostic chart

Instrument cluster 0 263 220 ...



Rapid diagnostic chart (continued)

Test step	Switch setting V Ω	Explanatory note on testing (All measurements to ground)	Pin on 35-pole plug of the instrument cluster	Test specifications	Coordinates
12	7 -	Start engine. (Engine speed pulses at Term. 7 of the ignition trigger box at idle)	31	approx. 0.7 V	C 19
13	8 -	Oil-pressure switch for 0.35 bar opens after approx. 0.3 bar. With that, the voltage rises from 0 V to approx. 12 V. Engine runs at idle.	3	approx. 12 V	C 21
14	9 -	Charge-air pressure sensor, ignition ON Voltage with engine off and air pressure approx. 1 bar. Voltage at idle speed	16	1.3 ... 2.1 V approx. 0.35 V	C 23
15	10 -	Displacement sensor (delivers rectangular voltage). Switch ignition on, and move vehicle approx. 1 m	30	0-approx.5V-0V or approx.5V-0-approx.5V	D 1
16	11 -	Terminal 61 - alternator voltage D + 1. Start engine, increase idle speed 2. Stop engine	20	\geq 12 V 0 V	D 3
17	12 -	Fuel-consumption sensor supply voltage Ignition ON	19	approx. 5 V	D 5
18	13 -	Fuel-consumption sensor measured value (depending on the current position of the consumption sensor) Ignition ON	34	0 - 4.5 V	D 7
19	14 -	Rocker switch for on-board computer - press rocker switch on left. Ignition ON	33	5 V \rightarrow 0 V	D 9
20	15 -	Rocker switch for on-board computer - press switch on right. Ignition ON	15	5 V \rightarrow 0 V	D 11
21	16 -	Press reset button Ignition On	13	12 V \rightarrow 0 V	D 13

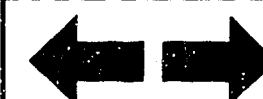
A15

Rapid diagnostic chart
Instrument cluster 0 263 220 ...



A16

Rapid diagnostic chart
Instrument cluster 0 263 220 ...



Rapid diagnostic chart (continued)

Test step	Switch setting V Ω	Explanatory note on testing (All measurements to ground)	Pin on 35-pole plug of the instrument cluster	Test specifications	Coordinates
22	17 -	Actuate reduced-display button Ignition ON	32	0 V → approx. 12 V	D 15
23	18 -	Switch on rear fog warning light (indicator light for rear fog warning light) Ignition ON, driving lights ON	24	approx. 12 V	D 17
24	19 -	Switch on hazard warning lights (indicator light for hazard warning system) Voltage pulse in rhythm with flashing frequency	6	approx. 6 V	D 19
25	20 -	Switch on heated rear window (indicator light for heated rear window) Ignition ON	22	approx. 12 V	D 21
26	21 -	Terminal 56a, high beam headlights (indicator light for high beam) Ignition ON, driving lights ON	7	approx. 12 V	D 23
27	22 -	Terminal 49a (indicator light for turn-signal). Actuate the turn-signal switch. Ignition ON Voltage in rhythm with the flashing frequency	23	12 V → 0 V	E 1
28	23 -	Actuate the instrument cluster brightness control Driving lights ON, ignition ON	26	approx. 6 - 12 V	E 3

A17

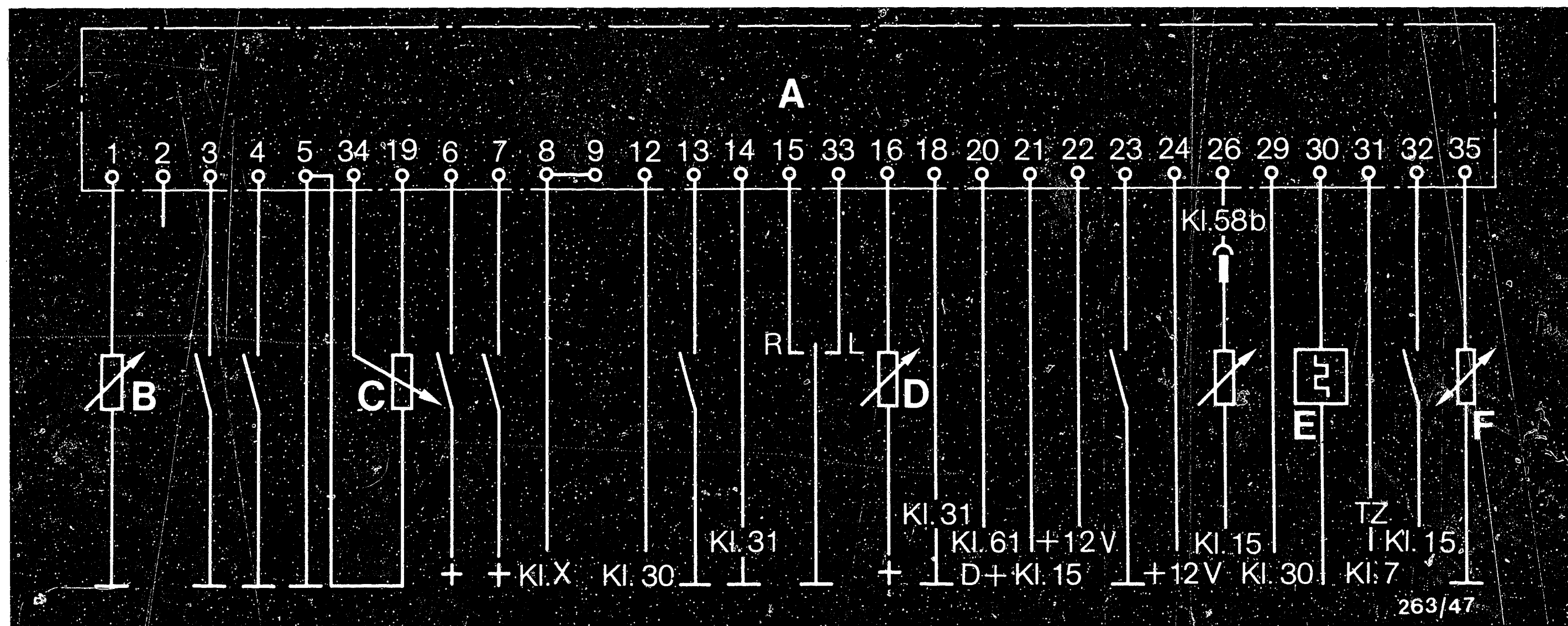
Rapid diagnostic chart
Instrument cluster 0 263 220 ...



A18

Rapid diagnostic chart
Instrument cluster 0 263 220 ...





5. Connection diagram (terminal assignment) of the instrument cluster

A = Instrument cluster

B = Tank sensor

C = Consumption sensor

D = Charge-air pressure sensor

E = Displacement sensor

F = Coolant temperature sensor

1 = Tank sensor

2 = Calibration output for fuel-consumption sensor

3 = Oil-pressure switch 0.3 bar

4 = Switch for indicator lamp "Warning"

5,34,19 = Connections for fuel-consumption sensor

6 = Switch for hazard-warning indicator

7 = Switch for high beam indicator

8, 9 = Term. X

12 = Term. 30

13 = Reset button for on-board computer

14 = Term. 31

15 = Rocker switch on right, for on-board computer

33 = Rocker switch on left, for on-board computer

16 = Charge-air pressure sensor

18 = Term. 31

20 = Term. 61

21 = Term. 15

22 = Heated rear window

23 = Switch for turn-signal indicator

24 = Fog warning light indicator

26 = Brightness control K 58 b

29 = Term. 30

30 = Displacement sensor

31 = Engine-speed signal from transistorized ignition

32 = Button for reduced display

35 = Temperature sensor

A19

Connection diagram

Instrument cluster 0 263 220 ...



A20

Connection diagram

Instrument cluster 0 263 220 ...



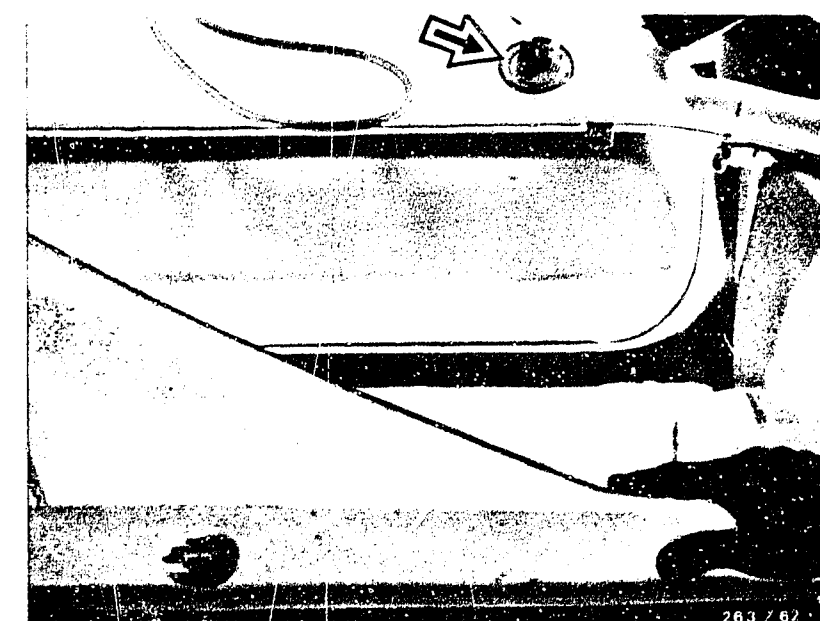
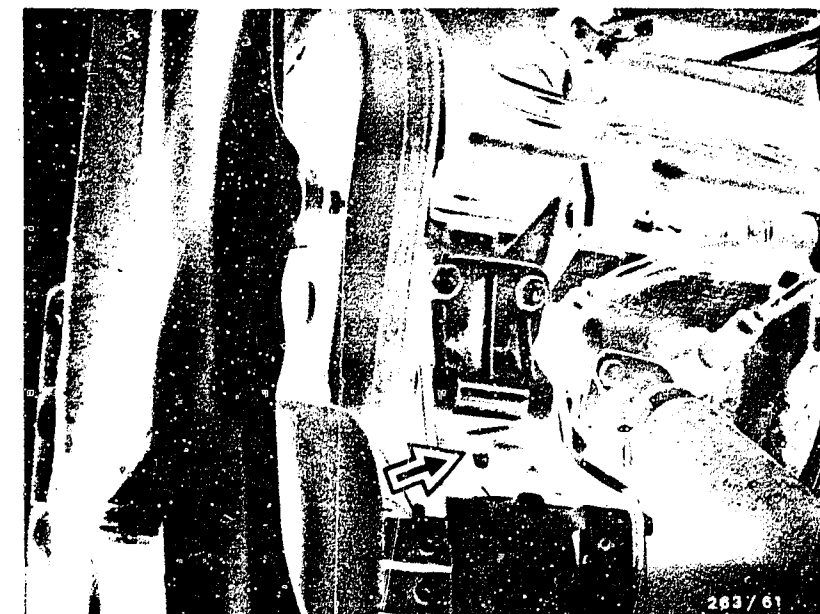
6. Installation position of the components

Electronic instrument cluster : Behind the steering wheel in place of the conventional instrument cluster (not shown)

Sensor for coolant temperature : On the engine block (see Figure at top)

Tank sensor : In the trunk compartment (see Figure at center)

Oil-pressure switch : Next to the oil dipstick (see Figure at bottom)



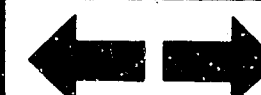
A21

Installation position of the components
Instrument cluster 0 263 220 ...



A22

Installation position of the components
Instrument cluster 0 263 220 ...



Installation position of the components (continued)

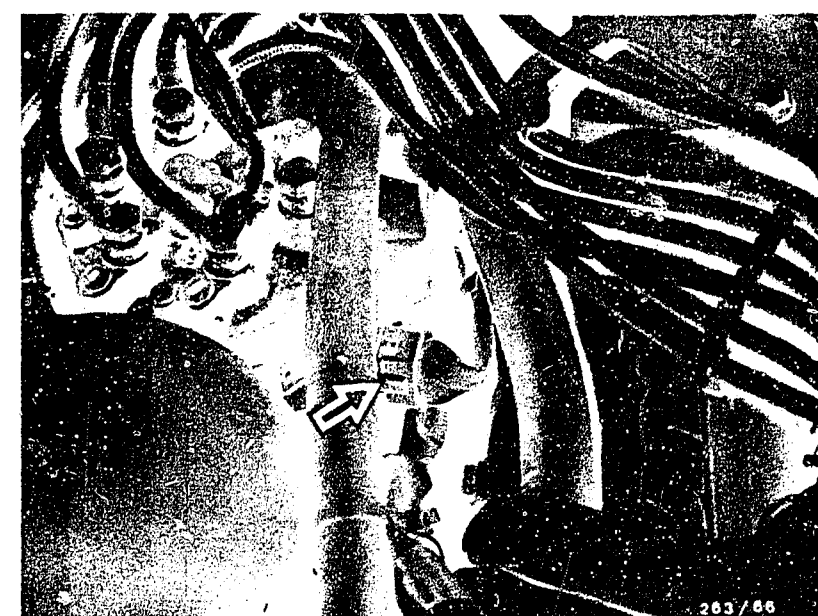
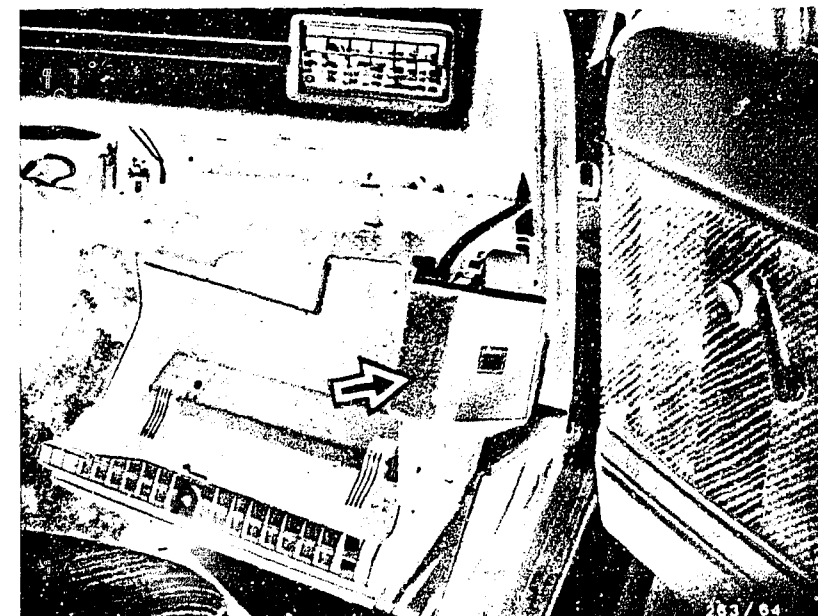
Charge-air pressure sensor : Integrated into the ignition control unit.

Ignition control unit : At the right next to the glove compartment
(Figure at top)

Displacement sensor : On the front differential, accessible on the
vehicle from underneath (see Figure at the center)

Fuel-consumption sensor : On the K-Jetronic air-flow sensor (see Figure
at bottom)

Battery : Under the rear bench seat (not shown)



A23

Installation position of the components
Instrument cluster 0 263 220 ...



A24

Installation position of the components
Instrument cluster 0 263 220 ...



7. Trouble-shooting chart

7.1 Trouble-shooting according to defect symptoms

There can be one or more defects causing the defect symptoms listed below.

Before testing: Check the customer complaint. (Check the operation according to the owner's manual.)

Defect symptom.

1. Instrument cluster does not light with ignition switched on
2. Instrument cluster does not light with reduced-display button actuated, but lights with ignition switched on
3. All displays stay lit longer than 3 seconds after switching on ignition
4. Engine speed display not functioning
5. Speedometer display not functioning
6. Fuel gauge display not functioning
7. Temperature gauge display not functioning

							Cause	Testing-Coordinates
●	●						Battery voltage Term. 30 or Term. 31 not reaching instrument cluster	B20 - B22, C11 - C18
	●						Reduced-display button defective (lead from reduced-display button)	B 6, D 15
●							Break in lead from Term. 15	C 13 - C 18
●	●						Voltage transformer on the instrument cluster defective	E 5 - E 6
●	●	●	●	●	●	●	Instrument cluster defective, take out and replace	B 12
			●				No engine speed signal from the transistorized ignition Term. 7	C 19
				●			Displacement sensor or lead defective	D 1
					●		Tank sensor or lead defective	C 3
						●	Temperature sensor or lead defective	C 1



Trouble-shooting according to defect symptoms (continued)

8. Fuel-consumption display not functioning

9. Charge-air pressure display not functioning

10. On-board computer is not showing a display

11. On-board computer displaying incorrect values

12. Indicator light for: fog warning light, hazard-warning lights, high beam, or heated rear window is not lighting

13. Indicator light for: "warning", charge, turn-signals, or oil pressure is not lighting

14. Indicator lights for "warning" and "charge" always light together

15. Indicator light for "warning" is always on, or does not light

16. Display poorly visible

<u>Causes</u>								<u>Testing-Coordinates</u>
●								Fuel-consumption sensor or lead defective C 5 - C 10
	●							Charge-air pressure sensor or lead defective C 23
		●						Function selector switch or lead to the instrument cluster defective D 9 - D 13
●	●	●	●	●	●	●	●	Take out and replace instrument cluster or corresponding sensors B 12
				●	●			Bulbs defective, take out and replace ----
				●				No ground connection B 20, B 22
					●			No connection from Term. 15 C 15, C 17
					●			Oil-pressure switch defective C 21
						●		Charging of battery not O.K. ---
							●	Speech synthesizer module defective E 8
							●	Brightness control or plug defective E 3

B3

Trouble-shooting chart

Instrument cluster 0 263 220 ...



B4

Trouble-shooting chart

Instrument cluster 0 263 220 ...

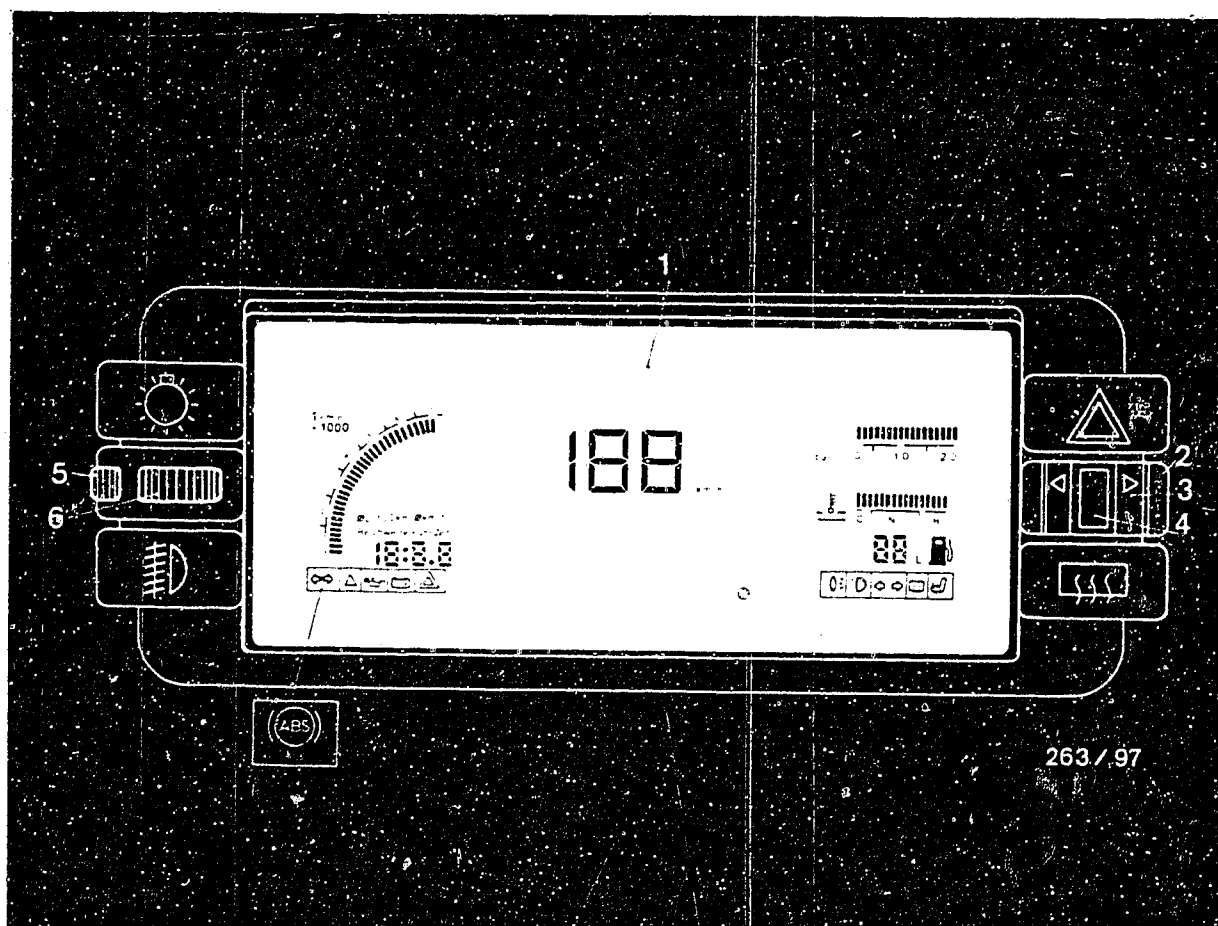


7.2 Trouble-shooting according to test steps

- Before testing:
Check customer complaint. (Check the operation of the instrument cluster according to the owner's manual.)
- Is the electrical system (fuses, battery voltage, etc.) O.K.?
- When working on the fuel system, follow accident prevention regulations and environmental and health regulations.
- Check all functions with the vehicle stationary and before removal of the instrument cluster.

For the detailed trouble-shooting starting from Coordinates B 19, perform the test steps one after the other. Only if a malfunction is indicated, continue with the possible defects as listed below the test steps.





7.3 Functional test of the instrument cluster

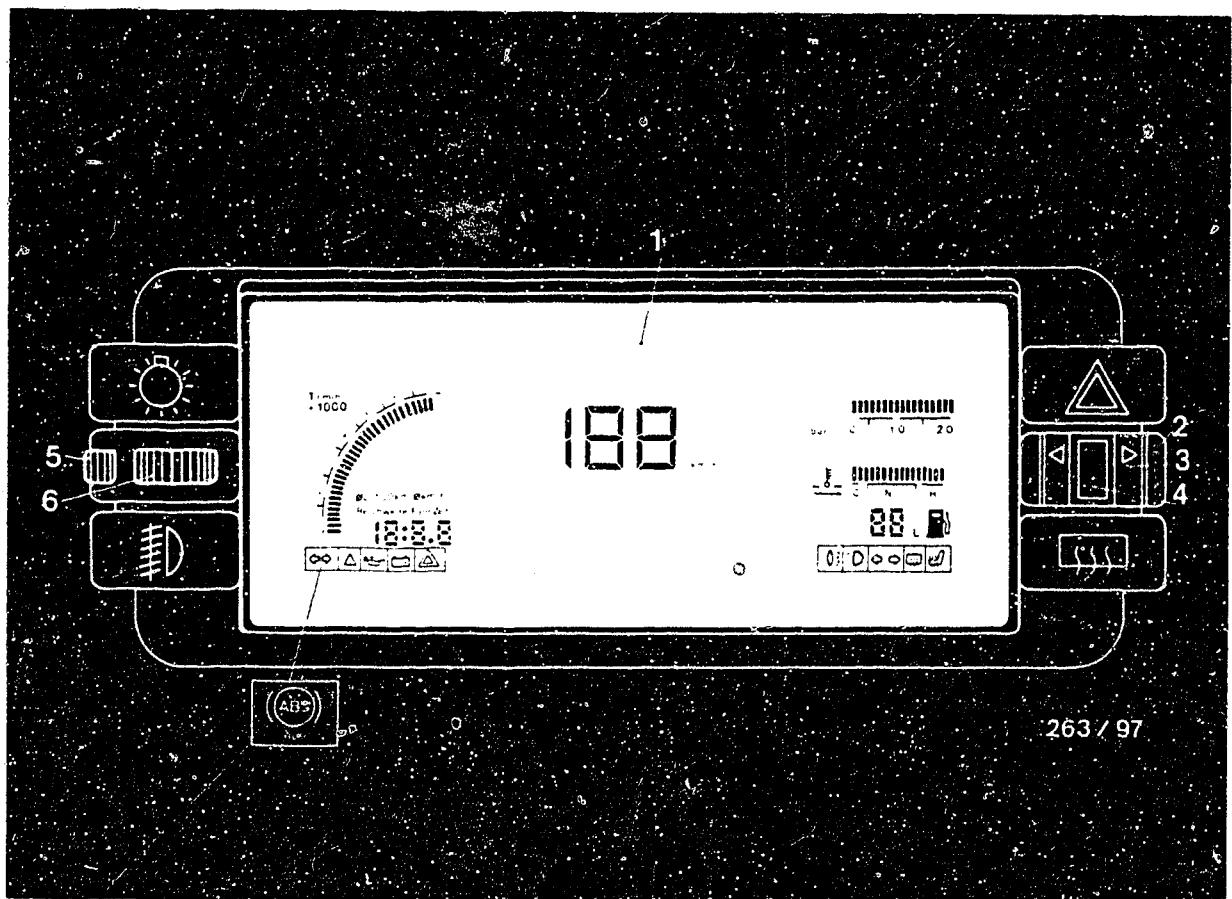
Functional test with ignition OFF

Press button for reduced display (5):

All digits and symbols of the instrument cluster light up (after approx. 0.5 sec.)

The on-board computer indicates the time of day.

In the case of instrument clusters 005 - 008, an ABS indicator light is installed instead of the trailer turn-signal indicator.



Functional test with ignition ON, engine not running

When the ignition is switched on, all electronic displays are automatically energized for a period of 3 seconds. The digital display for the speedometer and the digital display for the on-board computer each display a "2" as the first digit for 1 second, and then a "1".

After that:

Speedometer display:

0 km/h

Engine speed:

No segments

On-board computer indicates function selected.

Charge-air pressure with engine at standstill =

Air pressure, approx.
1 bar

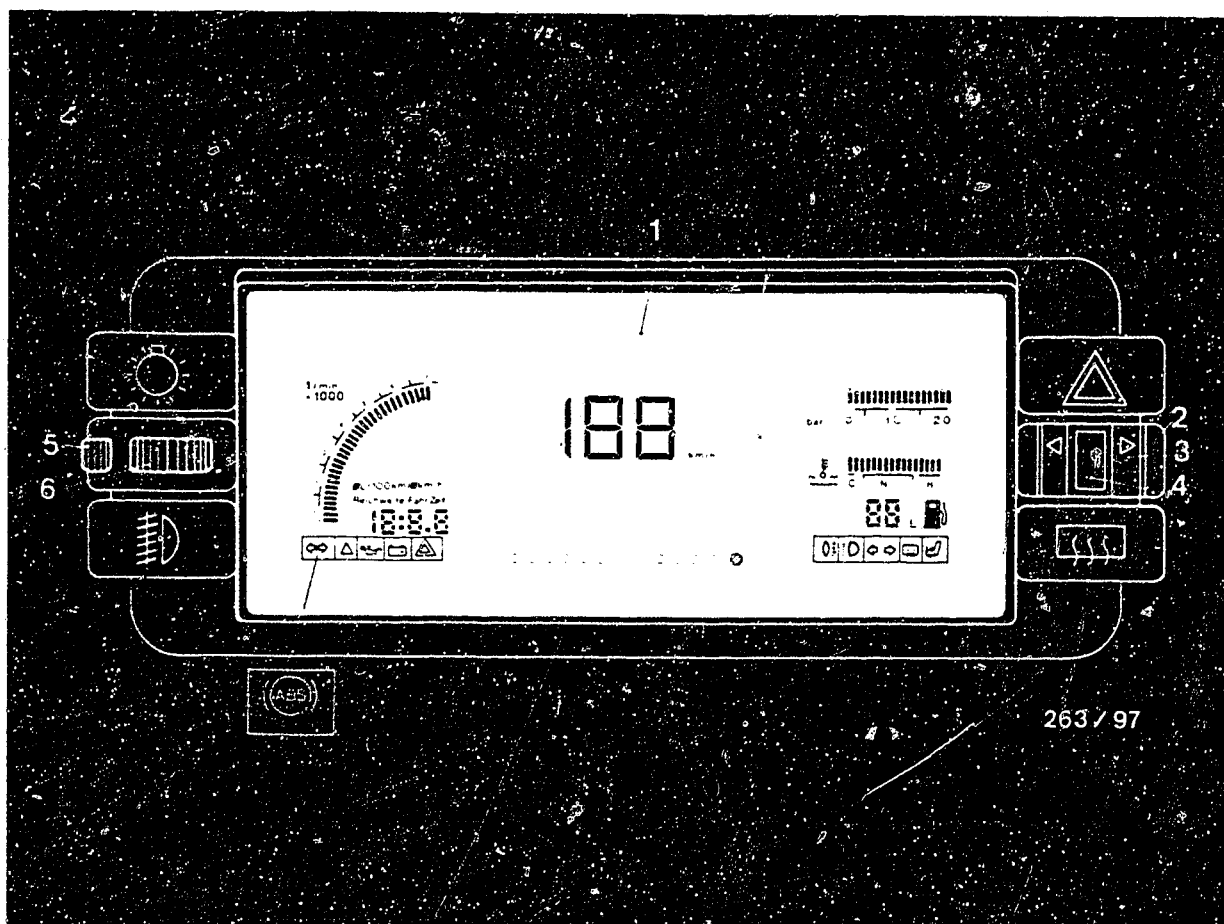
Coolant temperature:

Current temperature

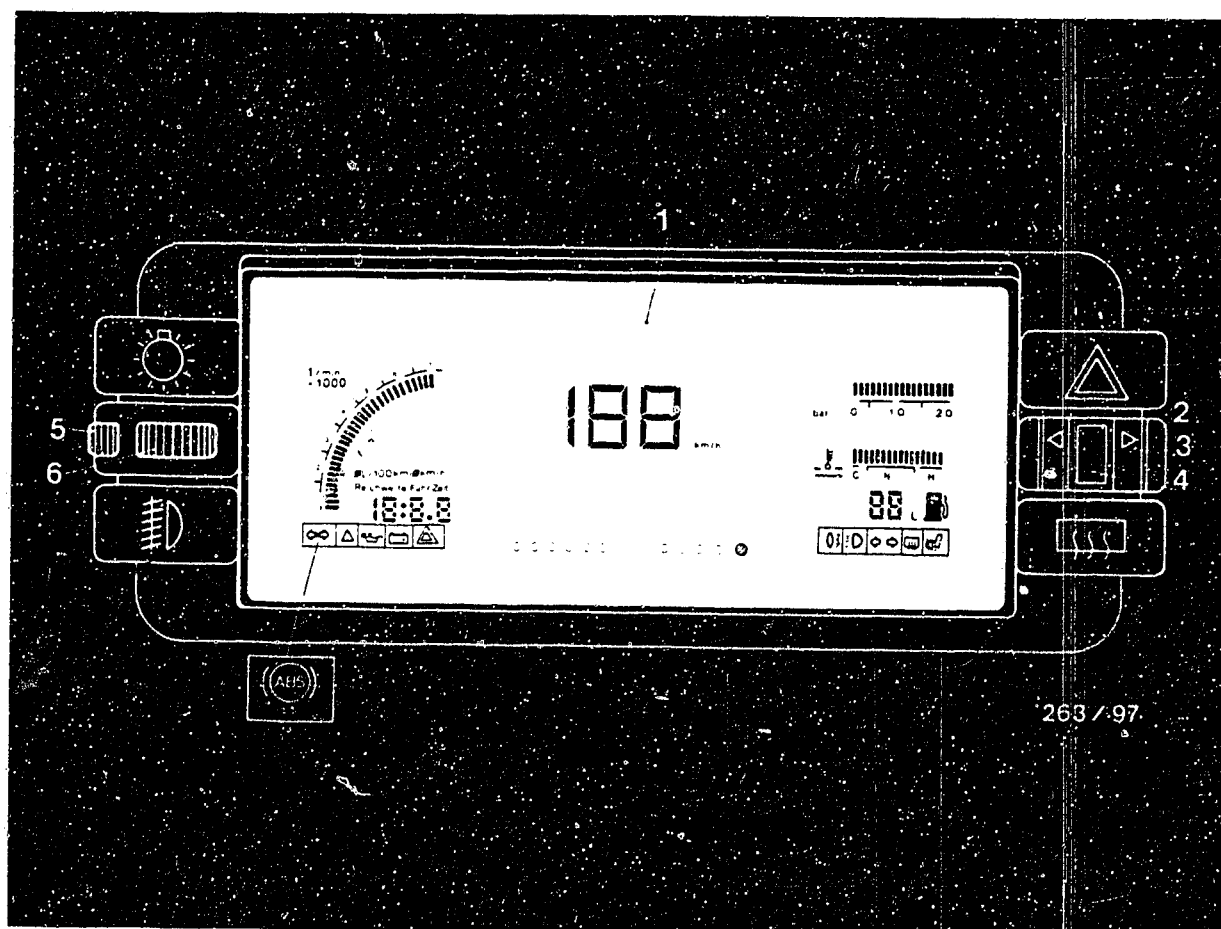
Fuel gauge display:

Current tank level.





In the case of instrument clusters 005 - 008, there is an ABS indicator light installed instead of the trailer indicator light.

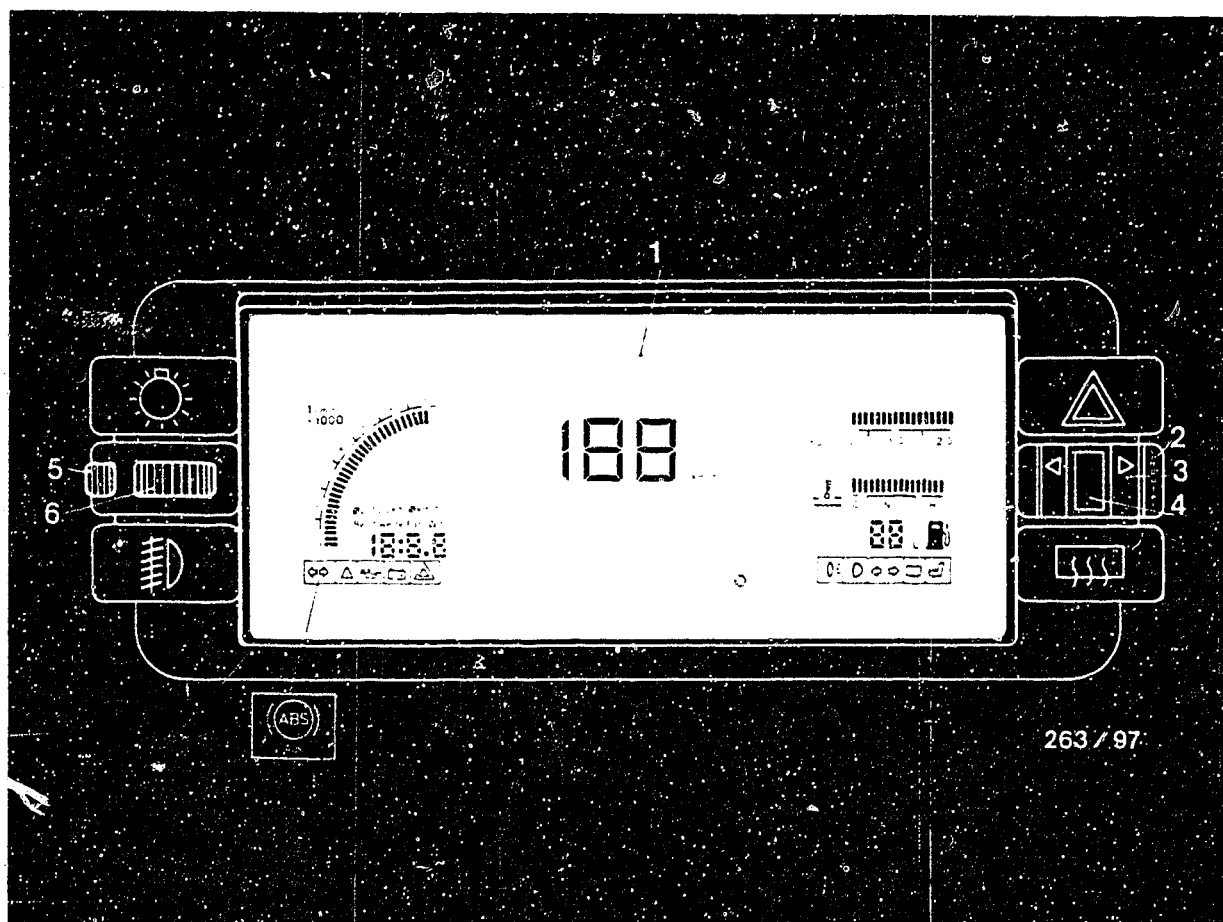


Functional test with ignition ON, engine running,
vehicle at standstill.

Speedometer reading:	0 km/h
Engine speed:	Current value
Charge-air pressure:	Current value
Coolant temperature:	Current value
Fuel gauge	Current value

In the case of instrument clusters 005 - 008, there is an ABS indicator light instead of the trailer indicator.





Functional test with ignition ON, engine running,
vehicle at standstill (continued)

The on-board computer indicates the function selected
as follows for instrument clusters:

005/006	001,002 007,008	
AVE MPH	Ø km/h	= Actual value since the last reset
FUEL Range	Reichweite (Fuel range)	= Fuel range still available, calculated according to the most recent average fuel con- sumption and the fuel remaining in the tank.

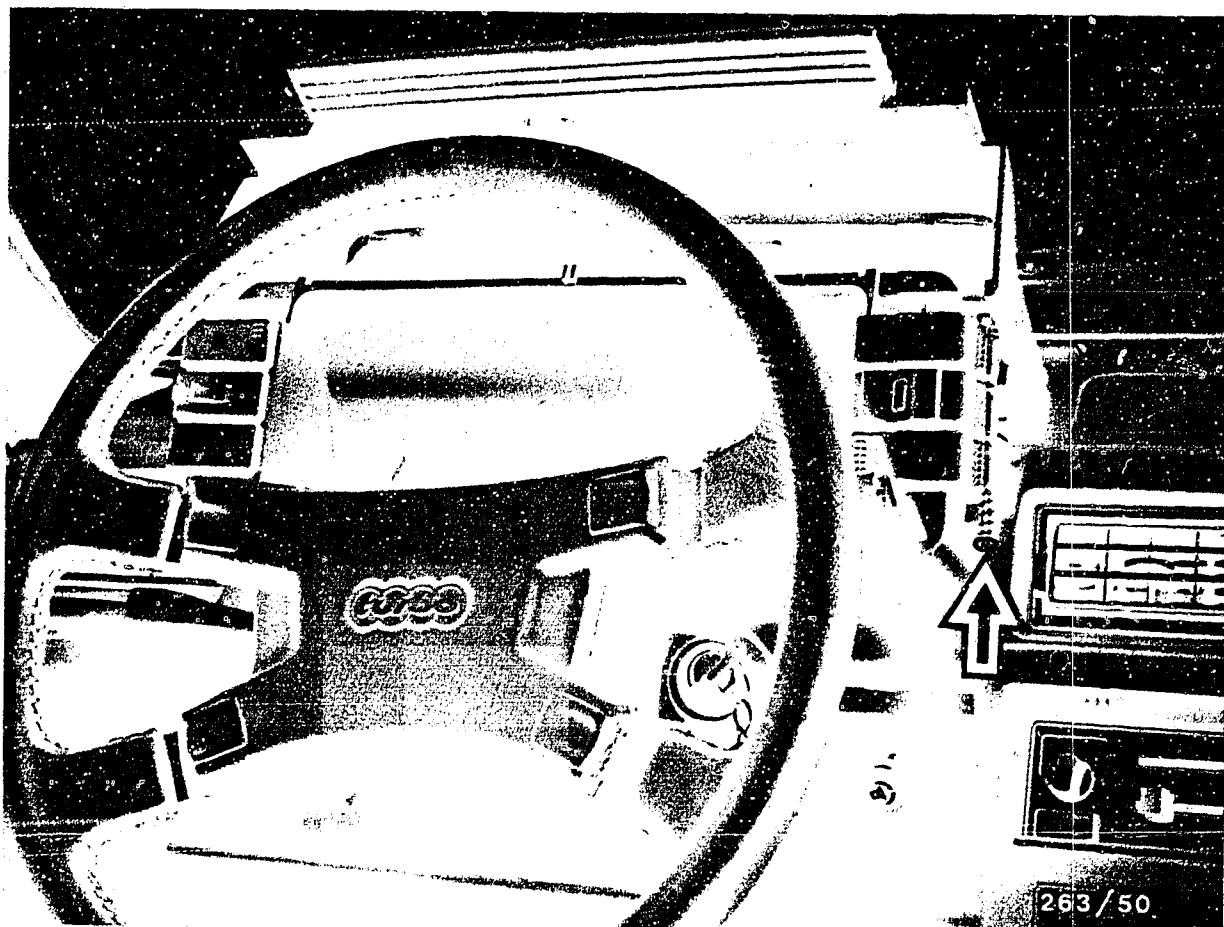
005/006	001,002 007,008	
ELPSD TIME	Fahrzeit (Elapsed time)	= Driving time only, calculated without pauses since the last reset
TIME	Zeit (Time)	= Time of day
MPG	Current fuel con- sumption	Average consumption from the preceding driving phase

B11

Trouble-shooting, functional test

Instrument cluster 0 263 220 ...





Top cover unscrewed and flipped up.
(One screw on left and one on right - see arrow.)

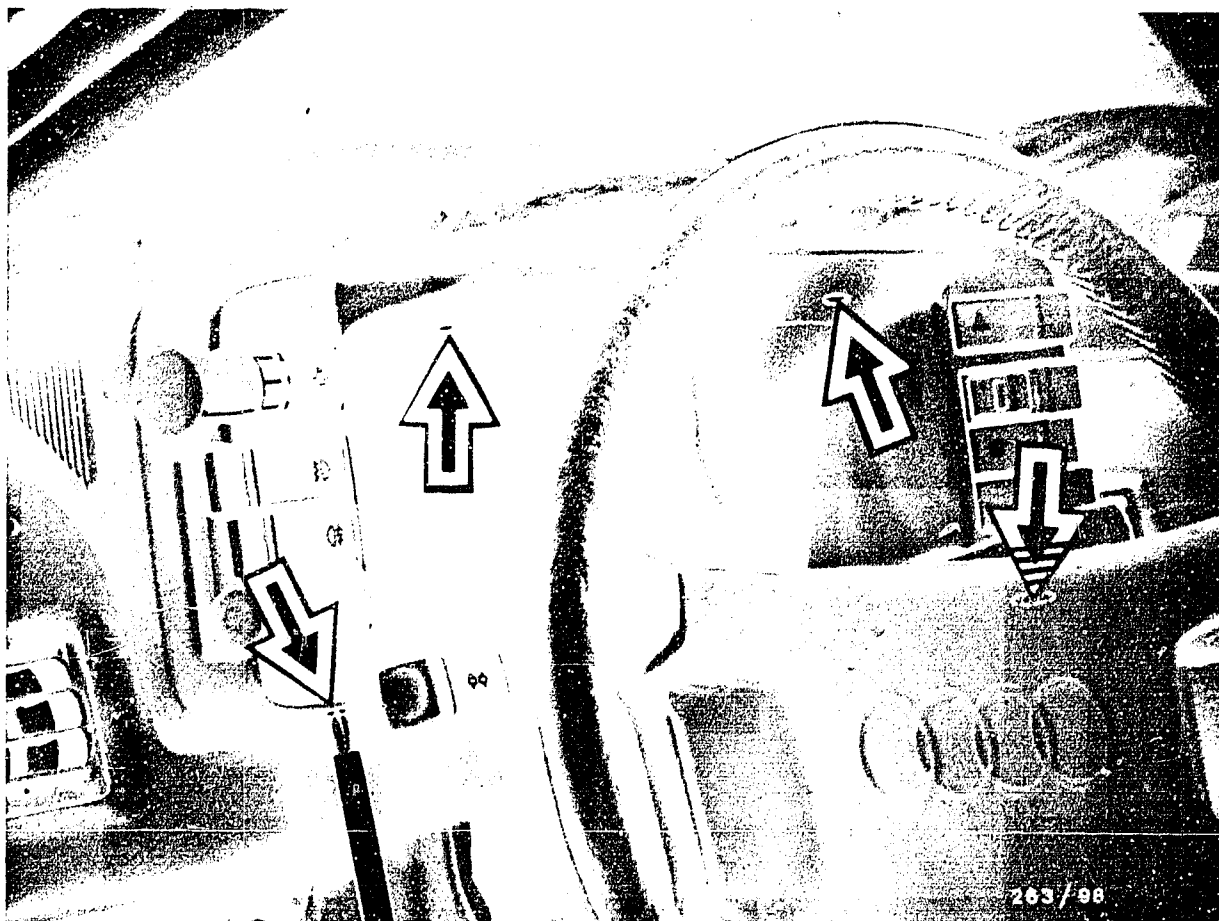
7.4 Removal of the instrument cluster

B12

Removal of the instrument cluster

Instrument cluster 0 263 220 ...





Starting in August 1983, a dashboard with a different design has been installed in the Quattro.

Removal of the instrument cluster is different from before.

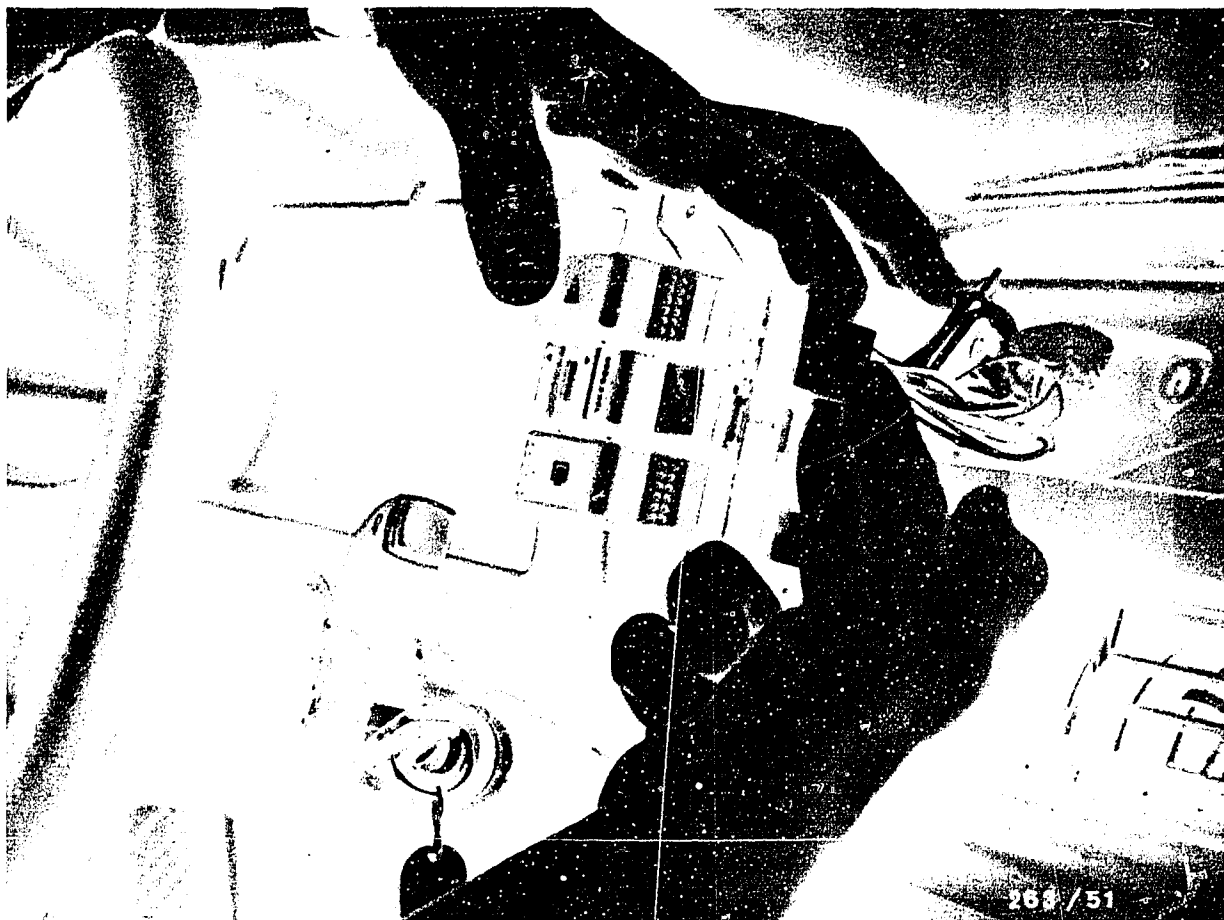
Remove the four Philips-head screws (see arrows).
One Philips-head screw is concealed.
Remove the instrument cluster cover.

B13

Removal of the instrument cluster

Instrument cluster 0 263 220 ...





After taking off the cover, press the switches on the right and on the left in the outer rim out in a forward direction. (See the Figure.) Disconnect the plug connection.

B14

Removal of the instrument cluster

Instrument cluster 0 263 220 ...





After taking off the cover, disconnect the plugs from the operating buttons. The frame with the operating buttons can now be taken off.

Unscrew the Philips-head screws at the right and the left of the instrument cluster as previously, and remove them.

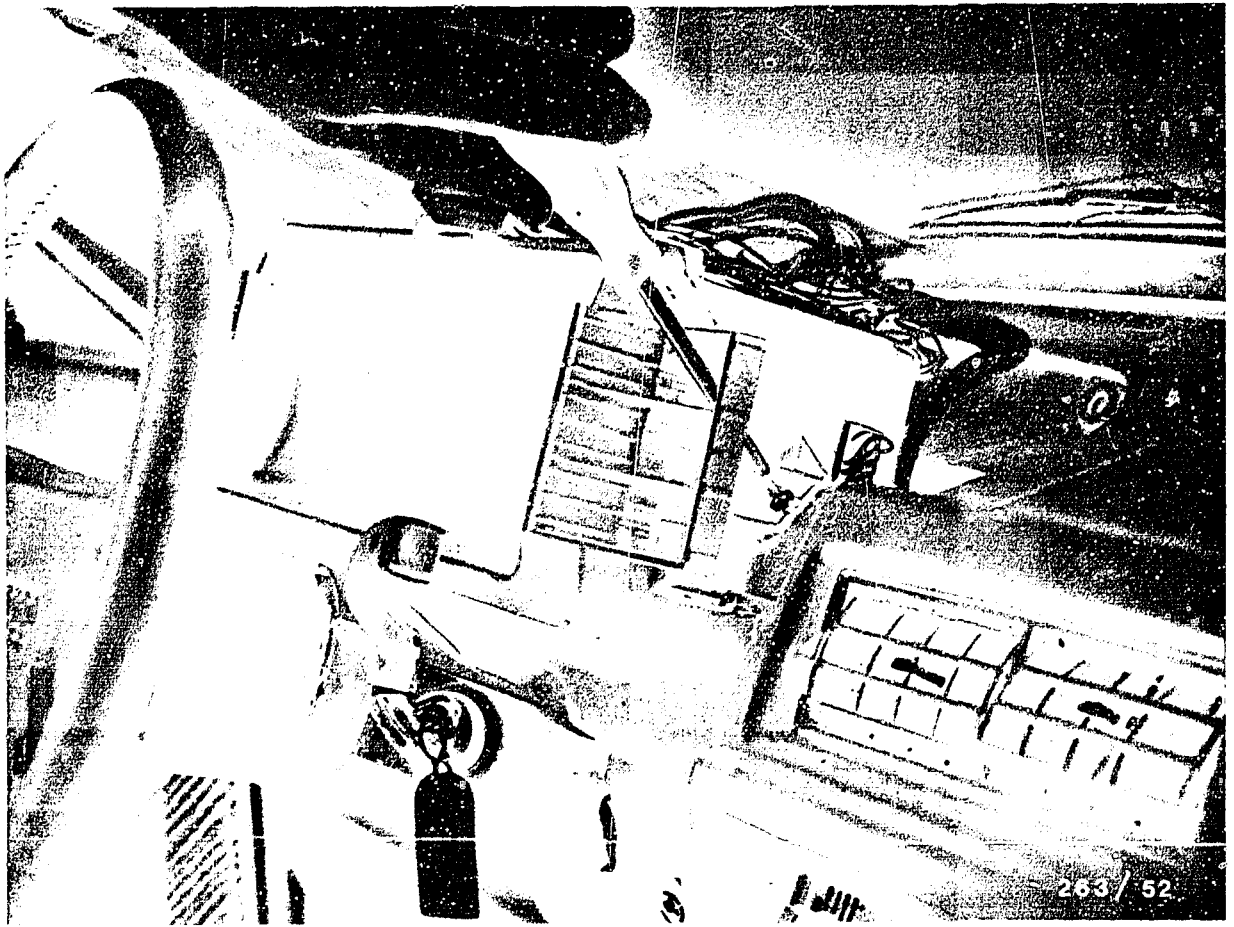
The plugs are color-coded and cannot be confused one for the other on installation.

B15

Removal of the instrument cluster

Instrument cluster 0 263 220 ...





Pull the plug connectors out of the outer rim toward the back and reconnect to the switches.

The instrument cluster can now be taken out.

Remove the Philips-head screws at the right and the left on the instrument cluster. (See the Figure.)

B16

Removal of the instrument cluster

Instrument cluster 0 263 220 ...





Flip up the instrument cluster and disconnect the 35-pole plug.

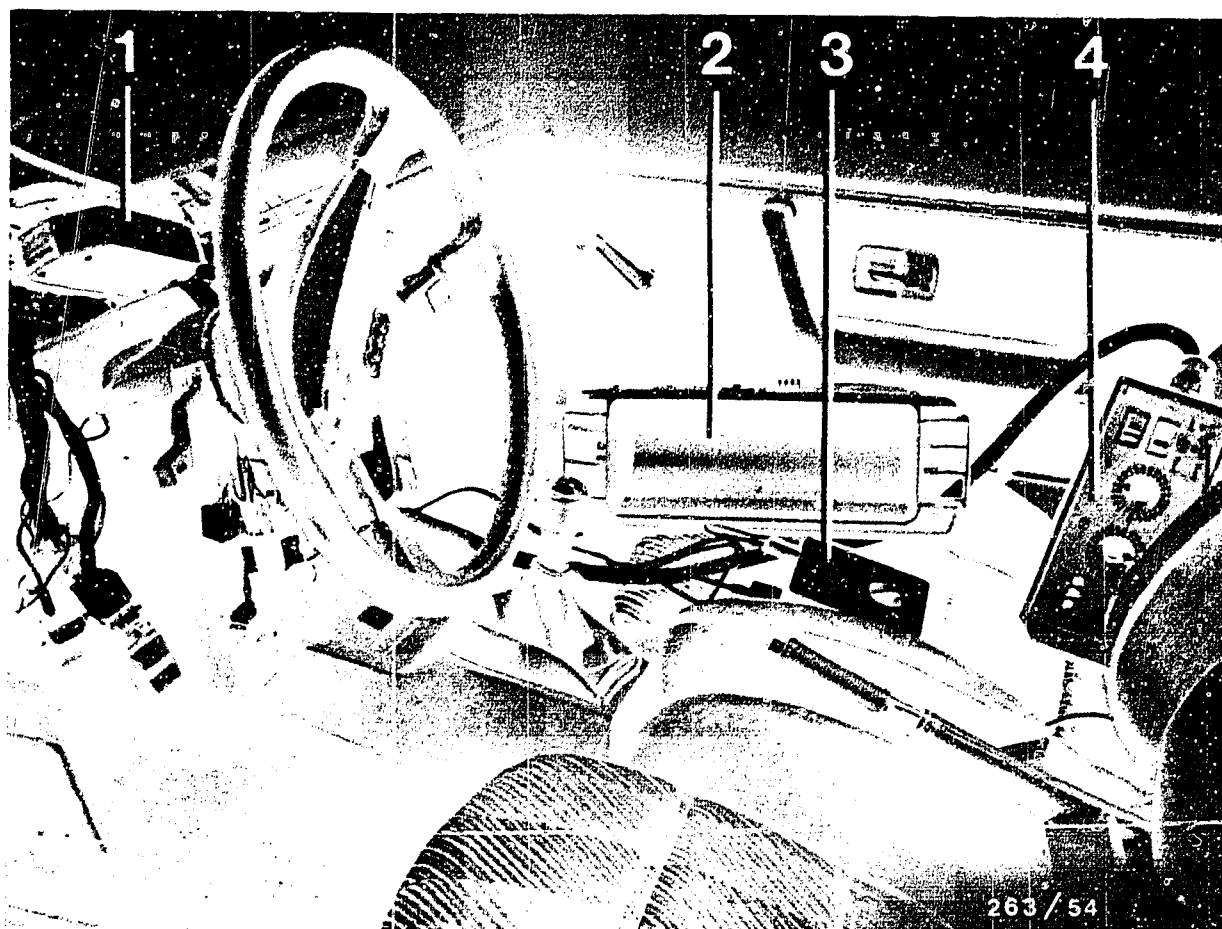
To do this, carefully lift the catch on the wiring harness plug using your thumb, and the 35-pole plug using the blade of a screwdriver. (See the Figure.)

B17

Removal of the instrument cluster

Instrument cluster 0 263 220 ...





- 1 = Connecting plug for the adapter lead plugged on the 35-pole connector of the vehicle wiring harness.
- 2 = Instrument cluster with the 35-pole connector for the adapter lead plugged on it
- 3 = Analog multimeter
- 4 = Universal test adapter with adapter lead KDES 0001 connected to it

7.5 Connecting the universal test adapter

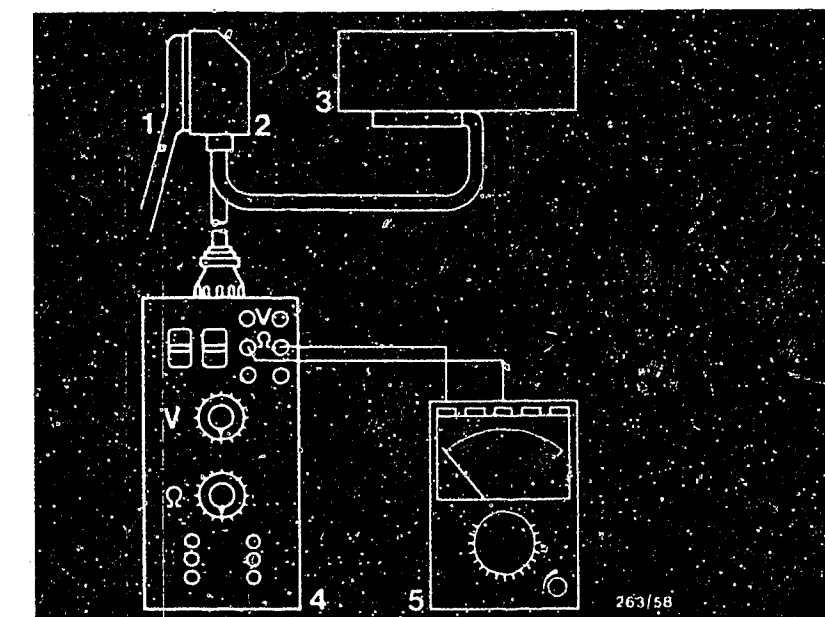


8. Trouble-shooting program

The detailed trouble-shooting program below is intended to enable the workshop employees, using the universal test adapter 0 648 101 801 and suitable test equipment, to detect quickly the causes for defects on the instrument cluster, the wiring harness, and sensors. The step-by-step approach adopted in this trouble-shooting program makes it possible for such faults to be detected quickly even by workshop employees who have had little experience or practice on the vehicle.



Test step 2			
Operation		Reading	Testing
Program switch setting "V"	↓	On the multimeter: approx. 0...10 Ω	Component: Connection from vehicle ground to the instrument cluster, Pin 18
Program switch setting "Ω"			
Test equipment: Universal test adapter Multimeter	6		Operation: Measurement of resistance, continuity
Range of measurement: Ω x 1			Malfunction: Reading ∞ Ω
Connection: Blue test sockets			
Operation in vehicle: —			



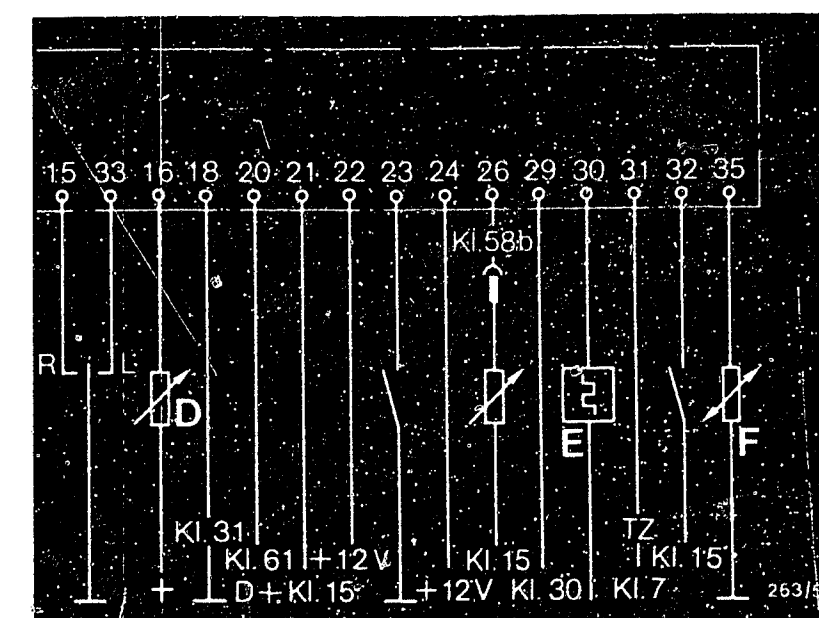
- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

There is a break or contact resistance in the lead from the central ground to pin 18.

Eliminate the break or contact resistance to pin 18 of the instrument cluster.



B22

Trouble-shooting

Instrument cluster 0 263 220 ...




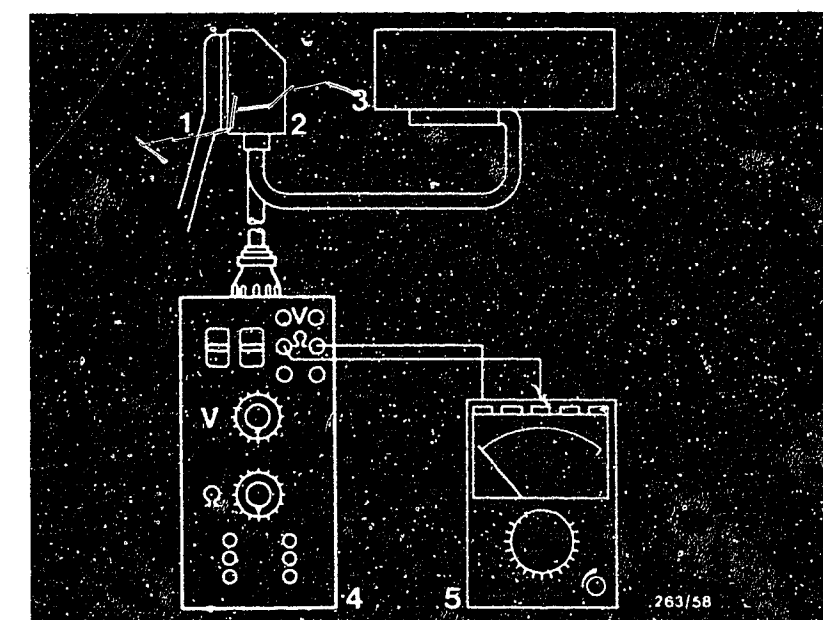
B23

Trouble-shooting

Instrument cluster 0 263 220 ...



Test step 3			
Operation		Reading	Testing
Program switch setting "V"		On the multimeter: R_{20} = approx. 1 k Ω R_{40} = approx. 500 Ω R_{60} = approx. 250 Ω R_{90} = approx. 100 Ω R_{120} = approx. 50 Ω	Component:
Program switch setting " Ω "			Pin 35
Test equipment: Universal test adapter Multimeter			Operation: Measurement of resistance
Range of measurement: $\Omega \times 10$			Malfunction: 0 Ω (short-circuit) $\infty \Omega$ (break)
Connection: Blue test sockets			
Operation in vehicle: Ignition OFF			
Additional operation: Disconnect plug on the instrument cluster.			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Temperature sensor connection (arrow)



Possible defects:

Broken off or short-circuited lead on temperature sensor.
Break on lead to the instrument cluster.
Temperature sensor defective.

Note on measurement: R_{20} means resistance at 20°C

R_{40} at 40°C, etc.

Take out and replace the leads to the temperature sensor or the sensor itself.
Take out and replace the leads to the instrument cluster Pin 35.

C1

Trouble-shooting

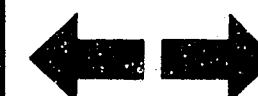
Instrument cluster 0 263 220 ...




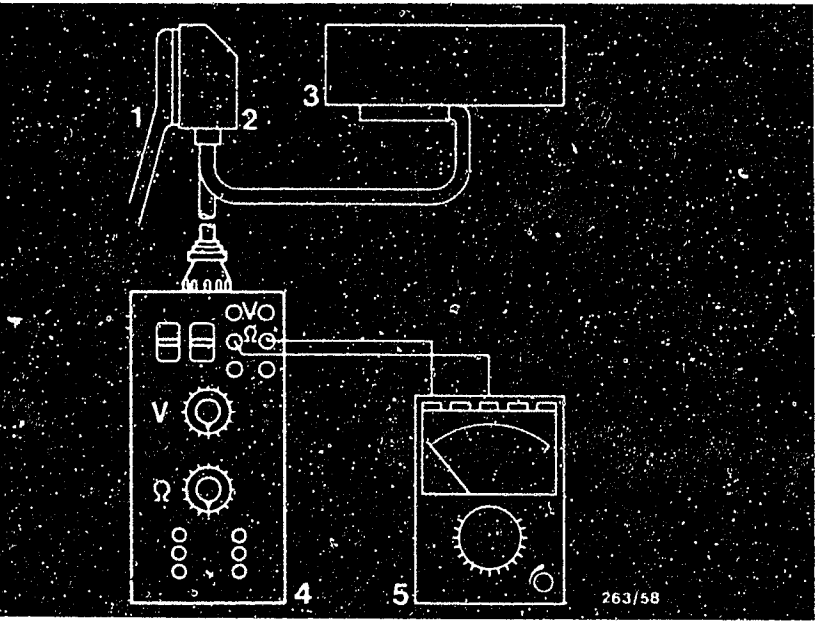
C2

Trouble-shooting

Instrument cluster 0 263 220 ...

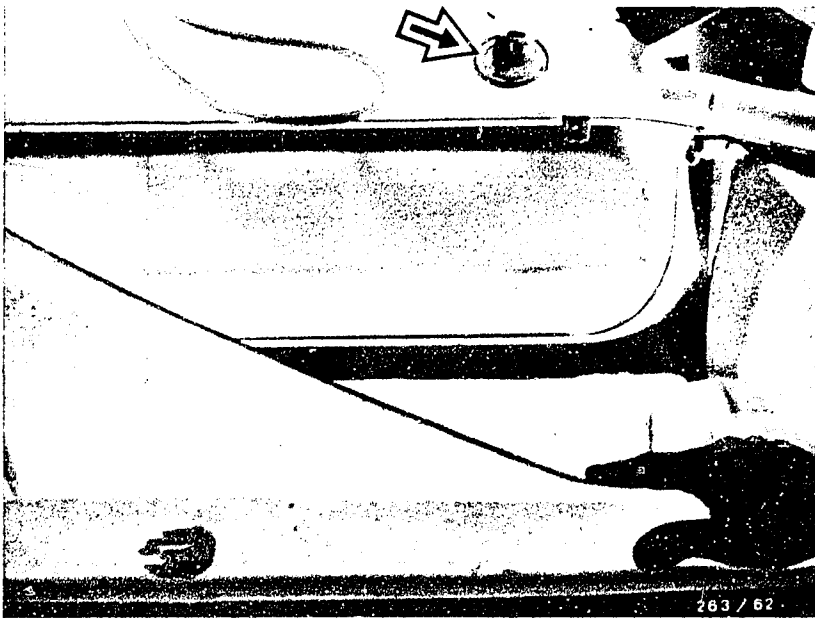


Test step 4			
Operation		Reading	Testing
Program switch setting "V"		On the multimeter: $R_{\text{empty}} = \text{approx. } 300 \, \Omega$ $R_{\text{full}} = \text{approx. } 30 \, \Omega$	<u>Component:</u> Tank sensor Pin 1
Program switch setting "Ω"	8		
Test equipment: Universal test adapter Multimeter			<u>Operation:</u> Measurement of resistance
Range of measurement: $\Omega \times 10$			<u>Malfunction:</u> No reading or incorrect reading
Connection: Blue test sockets			
Operation in vehicle: _____			
Additional operation: Disconnect plug on the instrument cluster.			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter


Tank sensor (arrow)
(accessible from the trunk compartment)

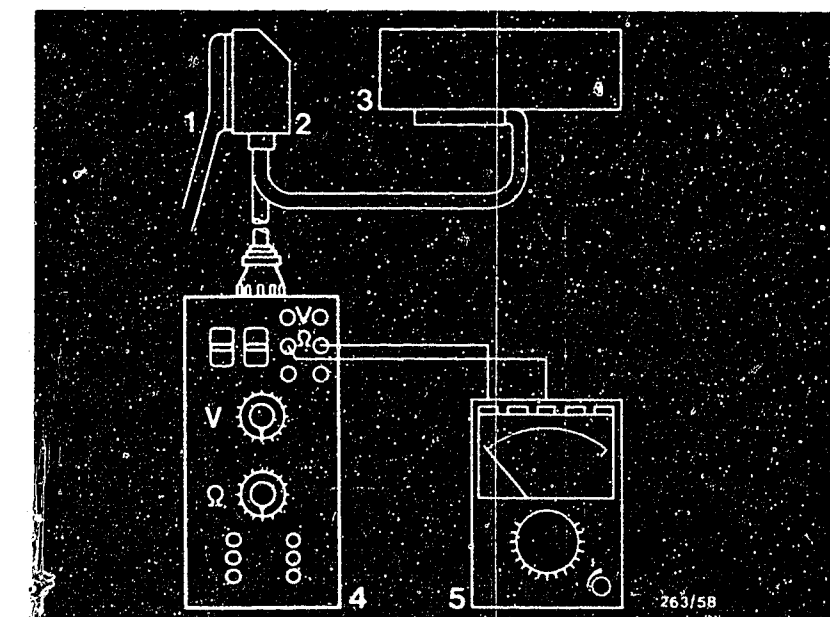


Possible defects:

There is a break or contact resistance in the lead to the tank sensor.
Pin Term. 1 of the instrument cluster is defective.
Tank sensor is defective.

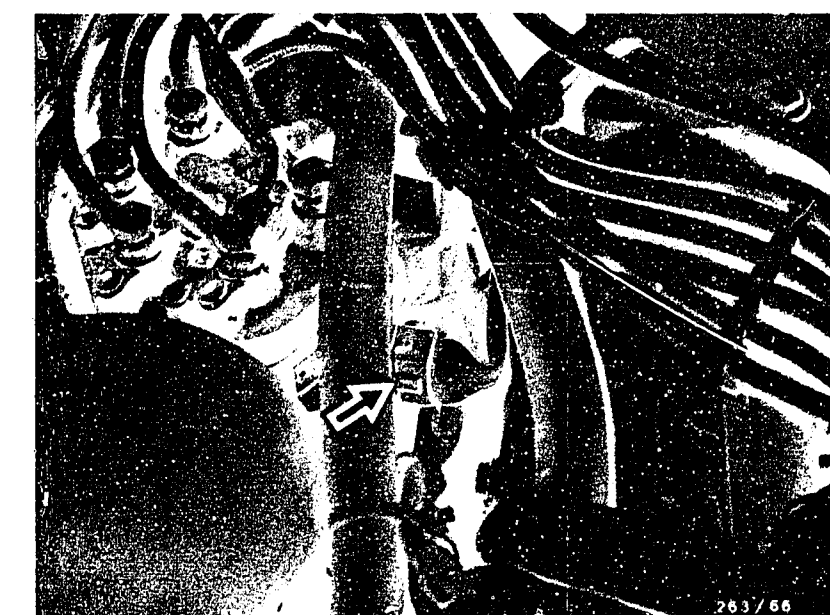
Take out and replace defective parts, such as the lead to the tank sensor or the tank sensor itself.

Test step 5			
Operation		Reading	Testing
Program switch setting "V"		On the multimeter: approx. 0...10 Ω	Component:
Program switch setting "Ω"			Ground lead from the fuel-consumption sensor Pin 5
Test equipment: Universal test adapter Multimeter			Operation: Measurement of continuity
Range of measurement: Ω x 1		Malfunction: ∞ Ω if there is a break in the lead	
Connection: Blue test sockets			
Operation in vehicle: _____			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Installation position of the fuel-consumption sensor (arrow)



Possible defects:

There is a break in the ground lead to the fuel-consumption sensor.

The ground lead to Terminal 5 above the instrument cluster is missing.

Eliminate the break in the lead.

C5

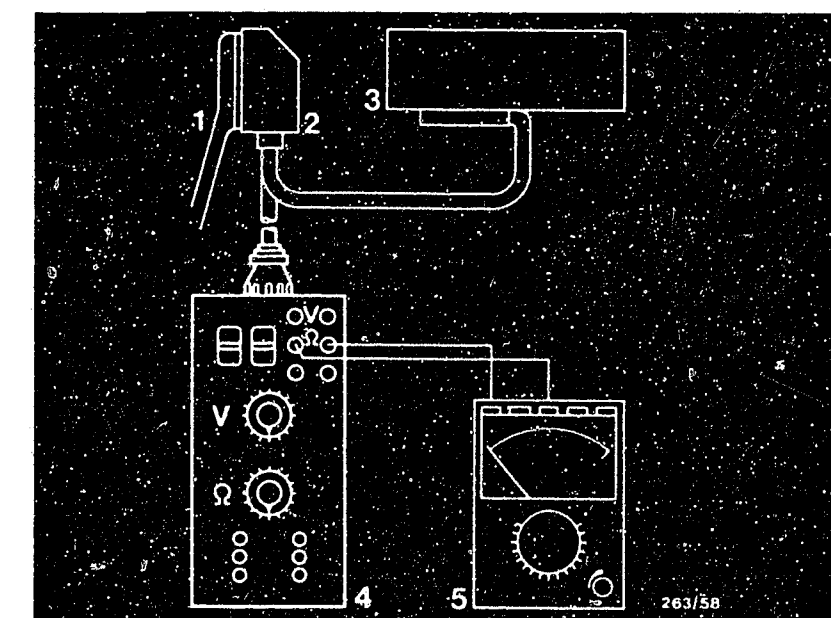
Trouble-shooting
Instrument cluster 0 263 220 ...



C6

Trouble-shooting
Instrument cluster 0 263 220 ...





- 1 = 35-pole connector to the vehicle wiring harness
 2 = Adapter lead
 3 = Instrument cluster
 4 = Universal test adapter
 5 = Multimeter

Test step 6		
Operation	Reading	Testing
Program switch setting "V"	<div> <div>↓</div> <div>3000...5000 Ω</div> </div>	<u>Component:</u> Fuel-consumption sensor Pin 19 to 5 (Ground)
Program switch setting "Ω"		
Test equipment: Universal test adapter Multimeter		<u>Operation:</u> Measurement of resistance
Range of measurement: Ω x 10		<u>Malfunction:</u> Resistance > 5000 Ω < 3000 Ω
Connection: Blue test sockets		
Operation in vehicle: _____		
<u>Additional operation:</u> Disconnect plug on the instrument cluster.		

Possible defects:

Break in lead from Pin 5 to Pin 23.
 Resistor of the fuel-consumption sensor defective.
 Take out and replace the lead to the fuel-consumption sensor.
 Take out and replace the fuel-consumption sensor.
 Adjustment takes place at test step 17.

Taking out and replacing the fuel-consumption sensor.

Take apart the 3-pole plug connection to the potentiometer (attached to the air-flow sensor). Scratch off the locking paint from the 4 fastening screws and unscrew the fastening screws. Carefully remove the potentiometer. Do not touch the brush-type wiper. Position the new brush housing with the seal ring inserted into it. Screw in the fastening screws, and finger-tighten them.

C7


Trouble-shooting
Instrument cluster 0 263 220 ...

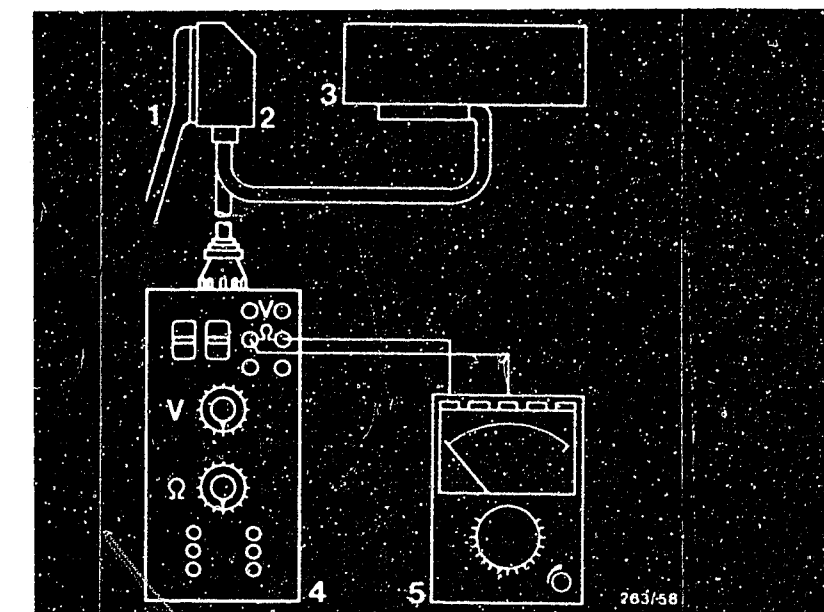


C8

Trouble-shooting
Instrument cluster 0 263 220 ...



Test step 7			
Operation		Reading	Testing
Program switch setting "V"		On the multimeter: 500 ... 900 Ω	<u>Component:</u> Fuel-consumption sensor Pin 34 to 5 (Wiper)
Program switch setting "Ω"			13
Test equipment: Universal test adapter Multimeter			<u>Operation:</u> Measurement of resistance
Range of measurement: Ω x 10			<u>Malfunction:</u> Resistance > 900 Ω < 500 Ω
Connection: Blue test sockets			
Operation in vehicle: _____			
Additional operation: Disconnect plug on the instrument cluster.			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Possible defects:

Break in lead from pin 34 to pin 5.
Take out and replace the resistor of the fuel-consumption sensor.
Take out and replace the fuel-consumption sensor.
Adjustment takes place in test step 17.

Taking out and replacing the fuel-consumption sensor.

Take apart the 3-pole plug connection to the potentiometer (attached to the air-flow sensor). Scratch off the locking paint from the 4 fastening screws and unscrew the fastening screws. Carefully remove the potentiometer. Do not touch the brush-type wiper. Position the new brush housing with the seal ring inserted into it. Screw in the fastening screws, and finger-tighten them.

C9

Trouble-shooting

Instrument cluster 0 263 220 ...



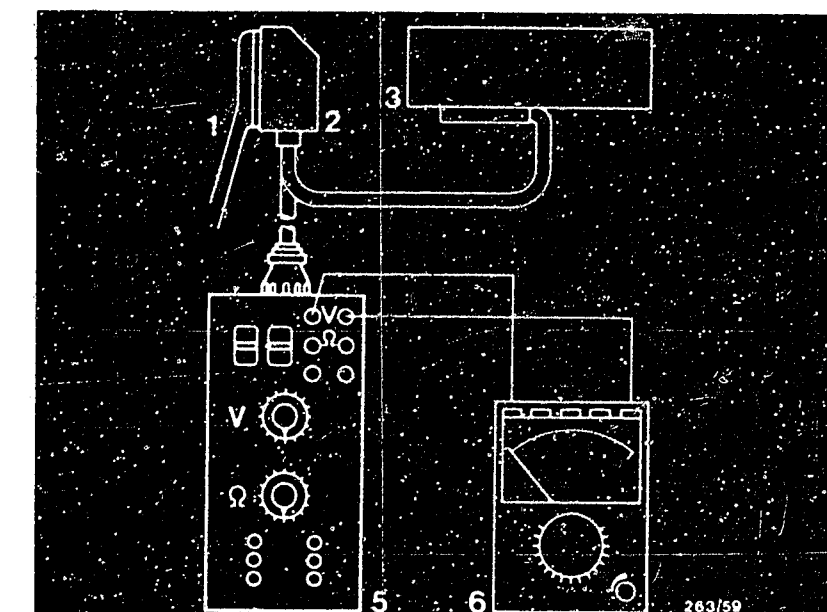
C10

Trouble-shooting

Instrument cluster 0 263 220 ...

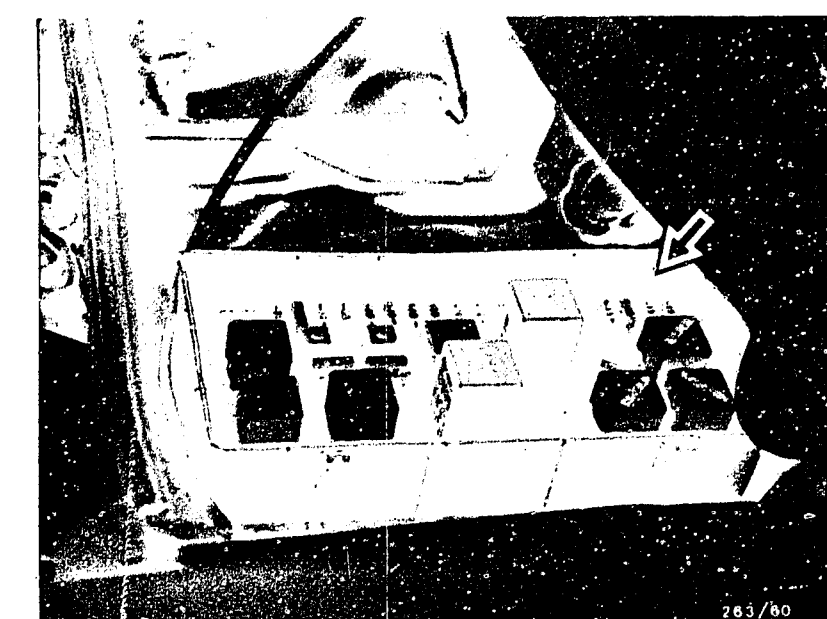


Test step 9			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch setting "V"</u>	2	On the multimeter: Battery voltage	<u>Component:</u>
<u>Program switch setting "0"</u>	--		Voltage supply for instrument cluster Pin 29
<u>Test equipment:</u> Universal test adapter Multimeter			<u>Operation:</u> Measurement of voltage
<u>Range of measurement:</u> 0 ... 15 V			<u>Malfunction:</u> No voltage present
<u>Connection:</u> Red test socket = + Black test socket = -			
<u>Operation in vehicle:</u> _____			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Fuse box in the engine compartment



Possible defects:

Lead from Term. 30 has no connection to Pin 29 of the instrument cluster.

Fuse No. 3 (25 A) in the fuse box has blown.

Eliminate break in the power supply lead from Term. 30 to Pin 29.

If necessary, take out and replace fuse No. 3 (25 A).

C13

Trouble-shooting
Instrument cluster 0 263 220 ...



C14

Trouble-shooting
Instrument cluster 0 263 220 ...



Test step 10

Operation

Program switch
setting "V"

3

Program switch
setting "Ω"

--

Test equipment:
Universal test adapter
Multimeter

Range of
measurement: 0 ... 15 V

Connection:
Red test socket = +
Black test socket = -

Operation in vehicle:
Ignition ON

Reading

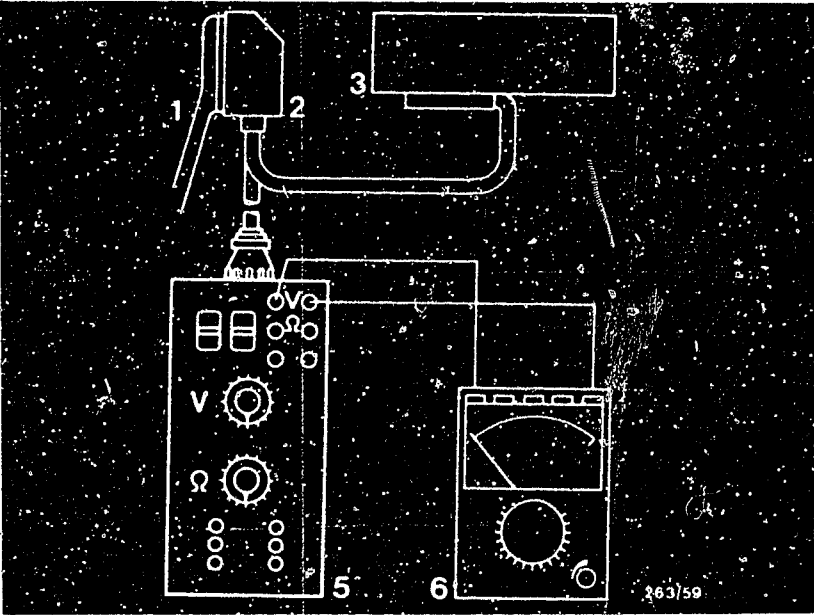
On the multimeter:
Battery voltage

Testing

Component:
Power supply for
instrument cluster
via ignition lock
Pin 21

Operation:
Measurement of voltage

Malfunction:
No voltage after
"ignition ON"
Battery voltage
too low



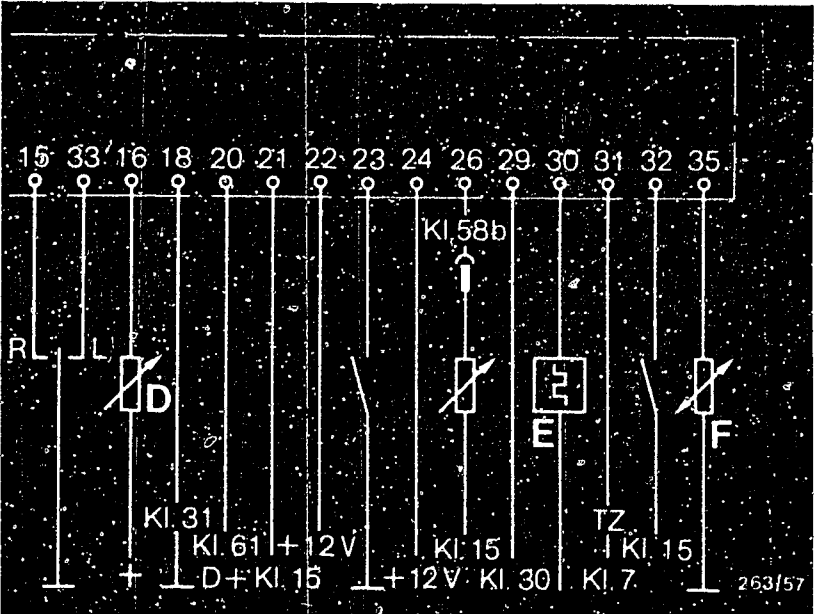
- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Partial connection diagram for the vehicle wiring harness to the instrument cluster

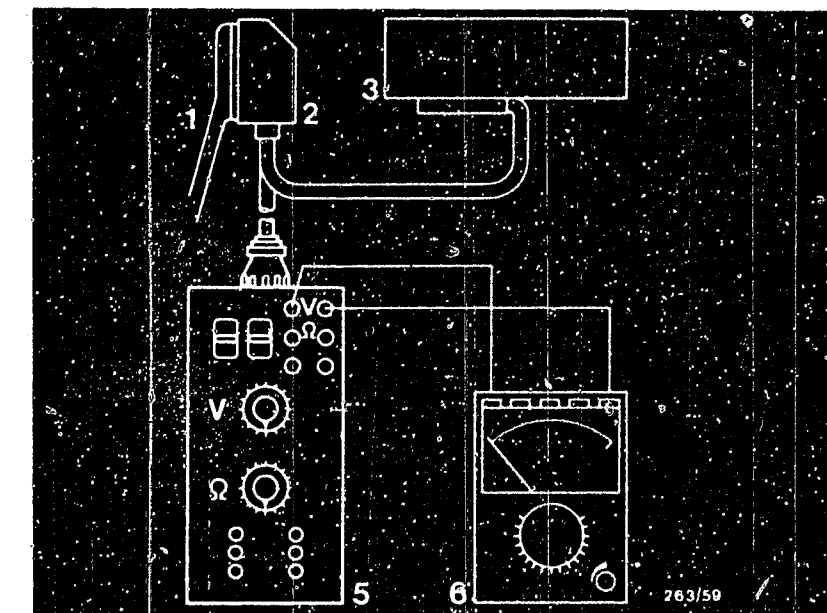
Possible defects:

The lead from the ignition lock Term. 15 to the instrument cluster Pin 21 has a break or contact resistance.

Eliminate the break and the contact resistances in the power supply lead from Terminal 15 to the instrument cluster Pin 21.

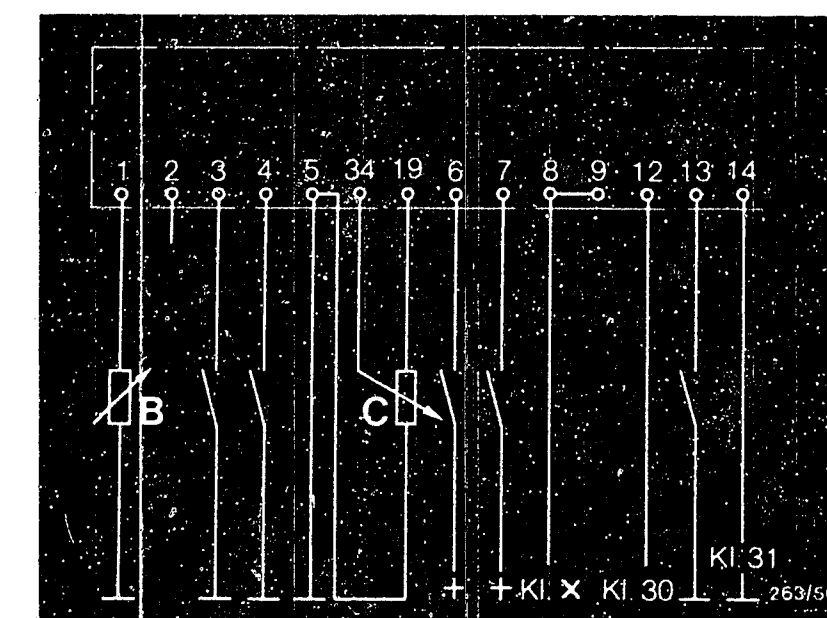


Test step 11			
Operation		Reading	Testing
Program switch setting "V"	4	On the multimeter: 1. approx. 12 V 2. approx. 0 V	<u>Component:</u> Power supply for instrument cluster via ignition lock Pins 8/9
Program switch setting "Ω"	--		
<u>Test equipment:</u> Universal test adapter Multimeter			<u>Operation:</u> Measurement of voltage
<u>Range of measurement:</u> 0 ... 15 V			
<u>Connection:</u> Red test socket = + Blue test socket = -			
<u>Operation in vehicle:</u> 1. Ignition ON 2. Activate starting motor briefly			<u>Malfunction:</u> No voltage after "ignition ON" Battery voltage too low



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Partial connection diagram for the vehicle wiring harness to the instrument cluster



Possible defects:

The lead from the ignition lock Term. X to the instrument cluster Pins 8/9 has a break or contact resistance.

Fuse No. 16 (30 A) in the fuse box has blown.

Eliminate the break and contact resistances in the power supply lead from Terminal 15 to the instrument cluster Pin 21.

If necessary, take out and replace fuse No. 16 (30 A).

C17

Trouble-shooting

Instrument cluster 0 263 220 ...



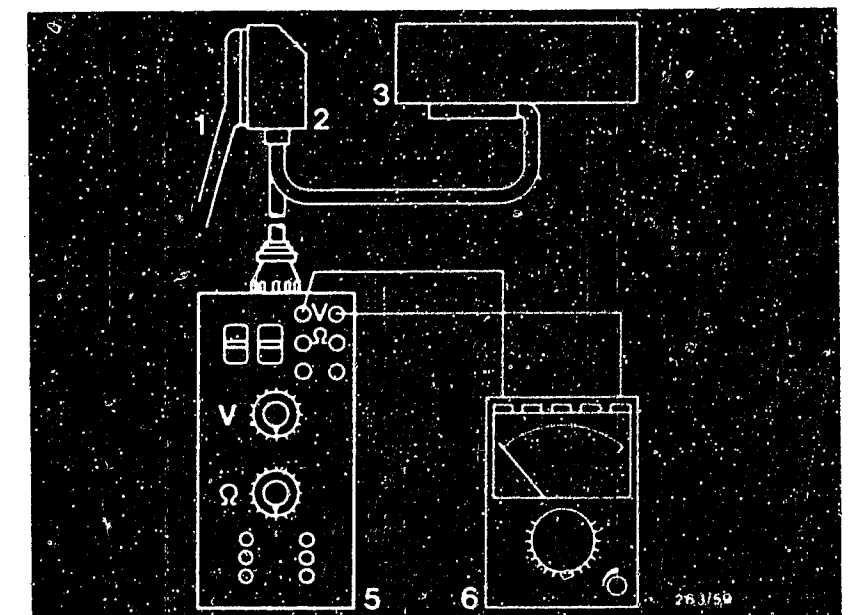
C18

Trouble-shooting

Instrument cluster 0 263 220 ...



Test step 12			
Operation		Reading	Testing
Program switch setting "V"	7	On the multimeter: approx. 0.7 V	Component: Ignition trigger box Pin 31
Program switch setting "Ω"	--		
Test equipment: Universal test adapter Multimeter			Operation: Measurement of voltage Engine speed signal
Range of measurement: 0 ... 5 V			
Connection: Red test socket = + Blue test socket = -			Malfunction: No voltage
Operation in vehicle: Ignition ON			
Additional operation: Engine idling.			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

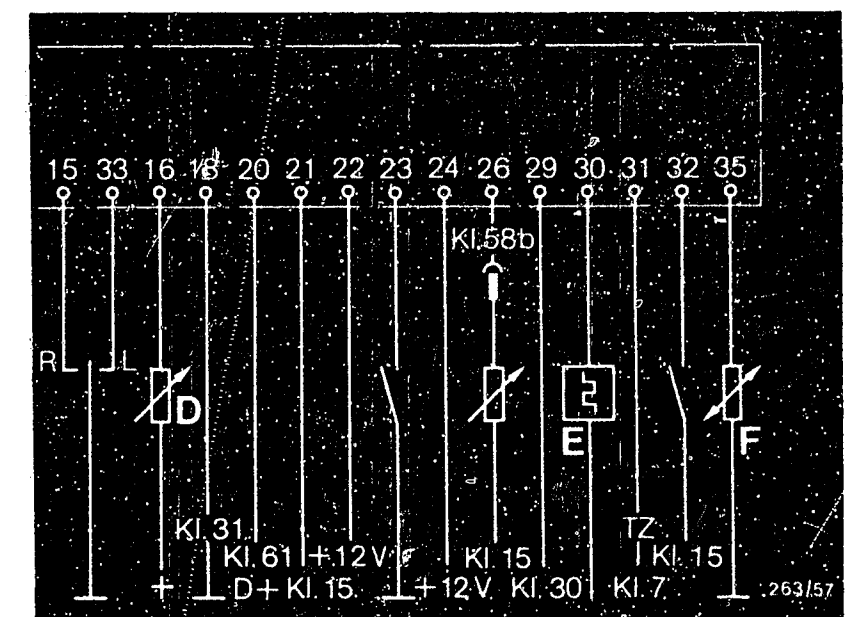
Break in lead or short-circuit at Pin 31 on the instrument cluster.

The plug at Term. 7 of the ignition trigger box is not making contact.

Note:

The ignition trigger box is located at the top in the glove compartment.

Eliminate break in lead or short-circuit.



C19

Trouble-shooting

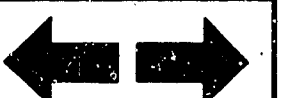
Instrument cluster 0 263 220 ...



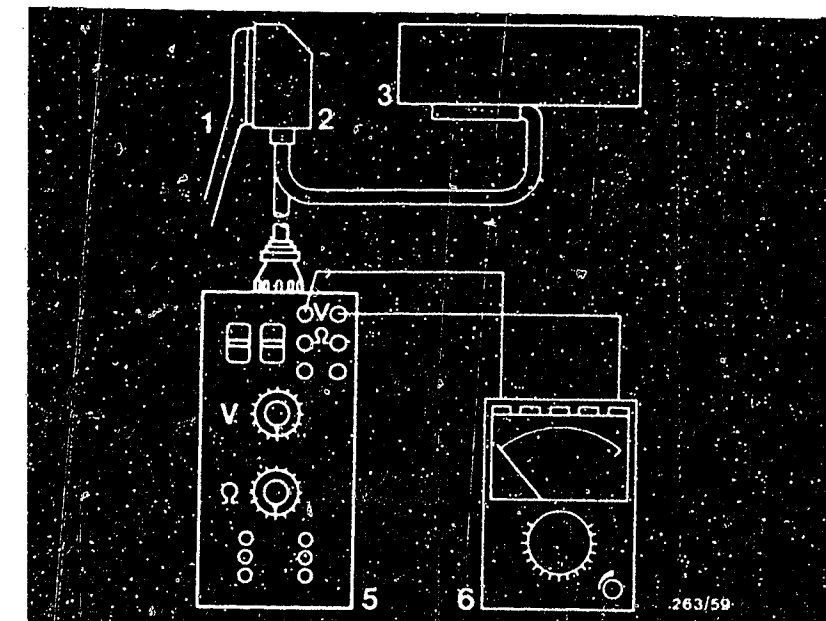
C20

Trouble-shooting

Instrument cluster 0 263 220 ...



Test step 13			
Operation		Reading	Testing
Program switch setting "V"	8	On the multimeter: 12 V	<u>Component:</u> Oil-pressure switch Pin 3
Program switch setting "Ω"	--		
Test equipment: Universal test adapter Multimeter			<u>Operation:</u> Opens at oil pressure of 0.35 bar
<u>Range of measurement:</u> 0 ... 15 V			
<u>Connection:</u> Red test socket = + Blue test socket = -			<u>Malfunction:</u> At 0 V
<u>Operation in vehicle:</u> Ignition ON Start the engine			
<u>Additional operation:</u> Have engine run until oil pressure rises above 0.35 bar			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Oil-pressure switch next to the oil dipstick



Possible defects:

Break in lead. The plug on the oil-pressure switch has slipped off - there is a break at Pin 3 on the instrument cluster.
The oil-pressure switch is defective.

Eliminate the break in the lead or take out and replace the oil-pressure switch.

C21

Trouble-shooting
Instrument cluster 0 263 220 ...

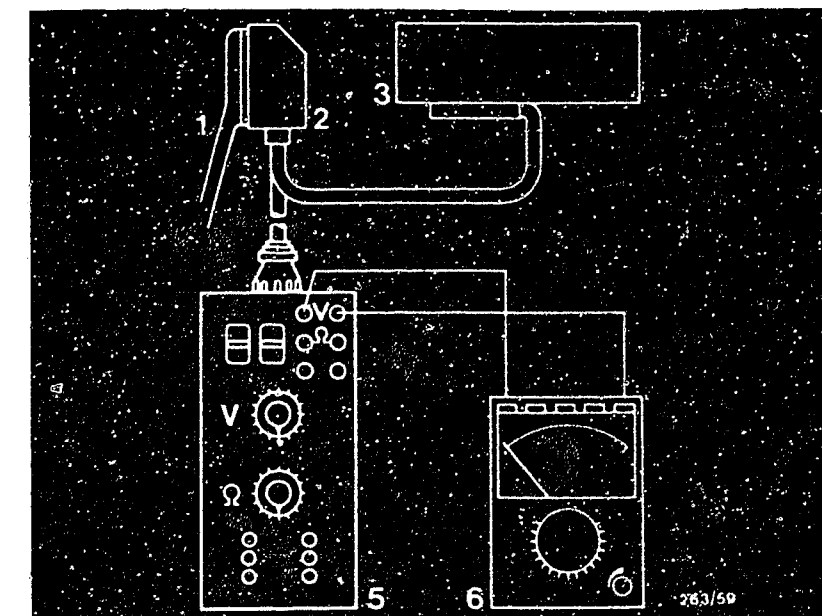


C22

Trouble-shooting
Instrument cluster 0 263 220 ...

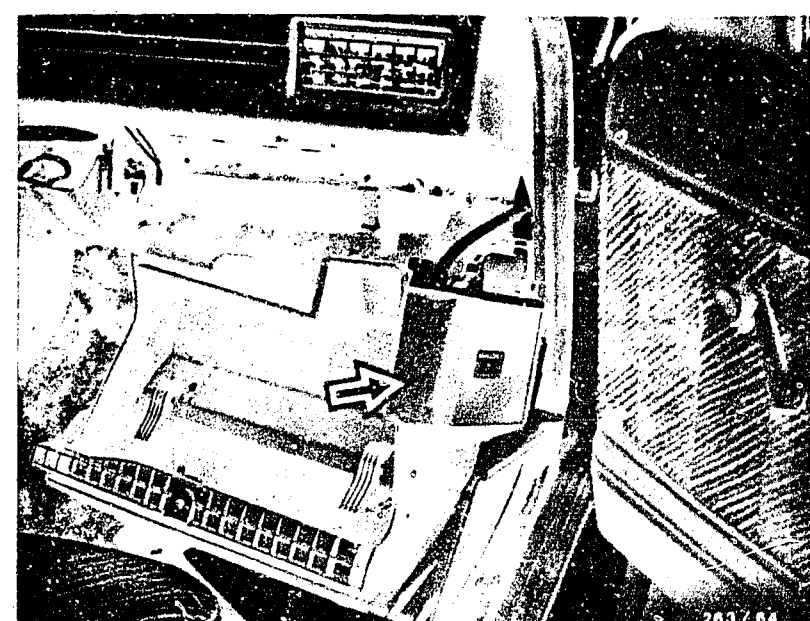


Test step 14			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch setting "V"</u>	9	On the multimeter:	<u>Component:</u> Charge-air pressure sensor Pin 16
<u>Program switch setting "Ω"</u>	--	With engine OFF and air pressure approx. 1 bar	<u>Operation:</u> Measurement of voltage with engine OFF or idle speed
<u>Test equipment:</u> Universal test adapter Multimeter		1.3 ... 2.1 V	
<u>Range of measurement:</u> 0 ... 5 V		At idle: approx. 0.35 V	
<u>Connection:</u> Red test socket = + Blue test socket = -			
<u>Operation in vehicle:</u> Ignition ON			<u>Malfunction:</u> At 0 V or > 2 V
<u>Additional operation:</u> 1. Engine OFF 2. Engine runs at idle			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Control unit for ignition control (arrow)



Possible defects:

The lead has a short-circuit or a break. Plugs do not make contact - there is a break at Pin 16 on the instrument cluster.
Charge-air pressure sensor is defective.

Note:

The charge-air pressure sensor is integrated into the ignition control unit (Hitachi). This instrument is located on the right next to the glove compartment (see Figure at bottom).

Take out and replace a defective connecting lead or charge-air pressure sensor (control unit for the ignition control)

C23

Trouble-shooting

Instrument cluster 0 263 220 ...



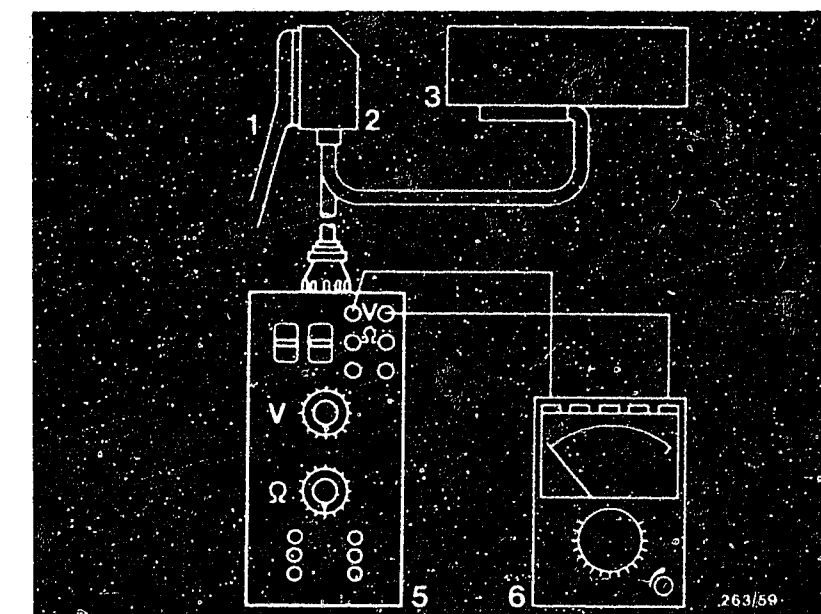
C24

Trouble-shooting

Instrument cluster 0 263 220 ...



<u>Test step 15</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch setting "V"</u>	10	On the multimeter: 0V→approx.5V→0V or approx.5V→0V→approx.5V	<u>Component:</u> Displacement sensor on the Cardan shaft Pin 30
<u>Program switch setting "Ω"</u>	--		
<u>Test equipment:</u> Universal test adapter Multimeter			<u>Operation:</u> Measurement of voltage (Pulsing EC voltage)
<u>Range of measurement:</u> 0 ... 15 V			
<u>Connection:</u> Red test socket = + Black test socket = -			<u>Malfunction:</u> At 0 V constant, or 6 V constant
<u>Operation in vehicle:</u> Ignition ON			
<u>Additional operation:</u> Move vehicle approx. 1.0 m.			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Displacement sensor (arrow) on the front differential



Possible defects:

No connection to Pin 30 on the instrument cluster.
The lead has a short-circuit or a break.
Displacement sensor defective.

Take out and replace defective leads or displacement sensor.

D1

Trouble-shooting

Instrument cluster 0 263 220 ...



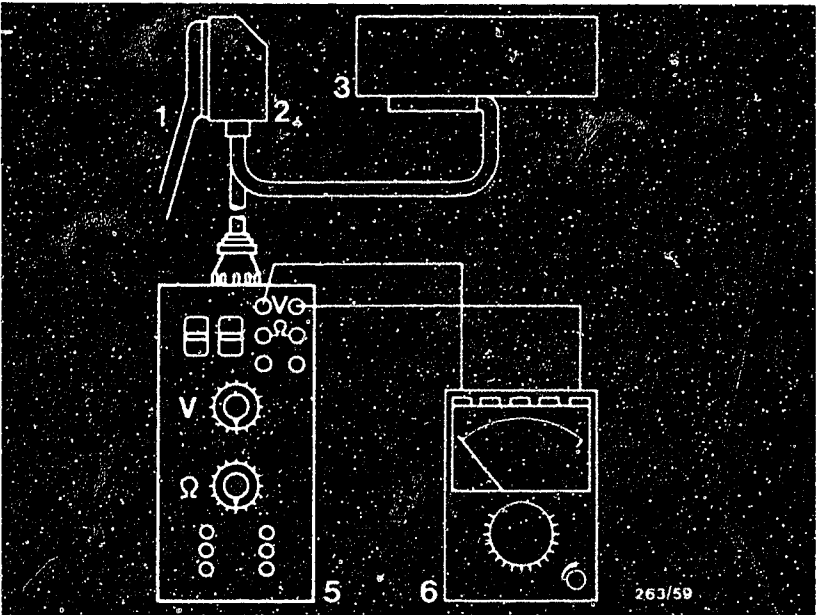
D2

Trouble-shooting

Instrument cluster 0 263 220 ...



Test step 16			
Operation		Reading	Testing
Program switch setting "V"	11	On the multimeter:	Component:
Program switch setting "Ω"	--	At fast idle:	Alternator and charge indicator light Pin 20
Test equipment:		≥ 12 V	Operation:
Universal test adapter			Alternator voltage increases to min. 12 V.
Multimeter			
Range of measurement: 0 ... 15 V			
Connection:		With engine off:	Malfunction:
Red test socket = +			≤ 12 V at fast idle.
Blue test socket = -			
Operation in vehicle:			
1. Start engine, run at fast idle.			
2. Shut off engine.			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

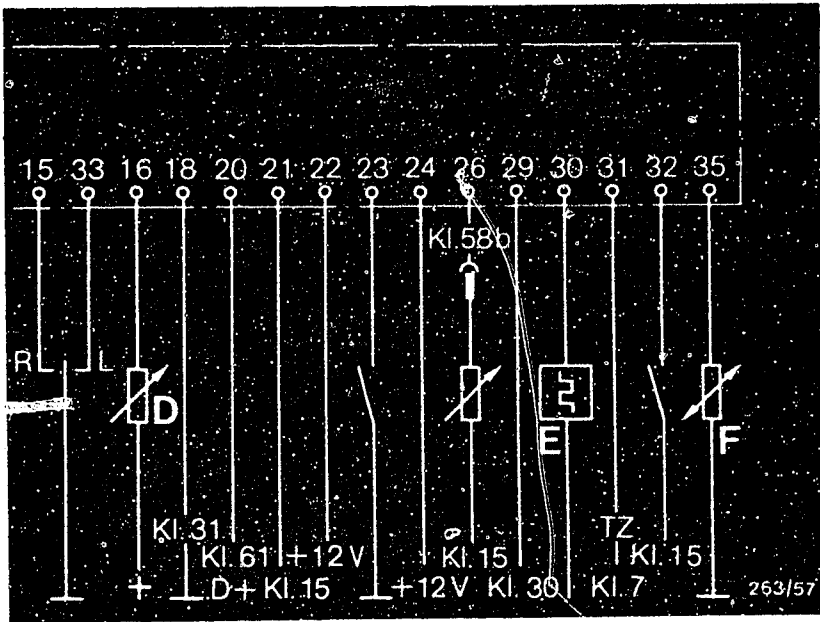
Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

The lead from Term. 61 (Alternator D+) to Pin 20 has a break or a short-circuit.

The charge indicator light (at Pin 20 of the instrument cluster) is defective.

Take out and replace defective leads or charge-indicator light



D3

Trouble-shooting
Instrument cluster 0 263 220 ...

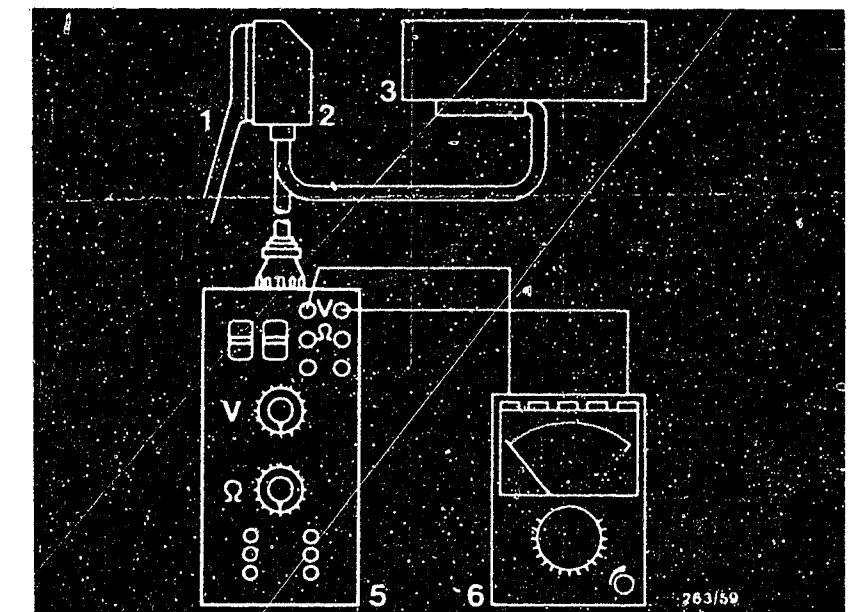


D4

Trouble-shooting
Instrument cluster 0 263 220 ...



<u>Test step 17</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch setting "V"</u>	12	On the multimeter: 5 V	<u>Component:</u> Supply voltage for fuel-consumption sensor Pin 19
<u>Program switch setting "Ω"</u>	--		
<u>Test equipment:</u> Universal test adapter Multimeter			<u>Operation:</u> Measurement of voltage
<u>Range of measurement:</u> 0 ... 5 V			<u>Malfunction:</u> With voltage less than or more than 5 V
<u>Connection:</u> Red test socket = + Black test socket = -			
<u>Operation in vehicle:</u> Ignition ON			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Possible defects:

The lead for the supply voltage to the fuel-consumption sensor is not connected to Pin 19 of the instrument cluster. There is a break in the lead.

The instrument cluster is defective. Pin 19 is not being supplied with 5 V.

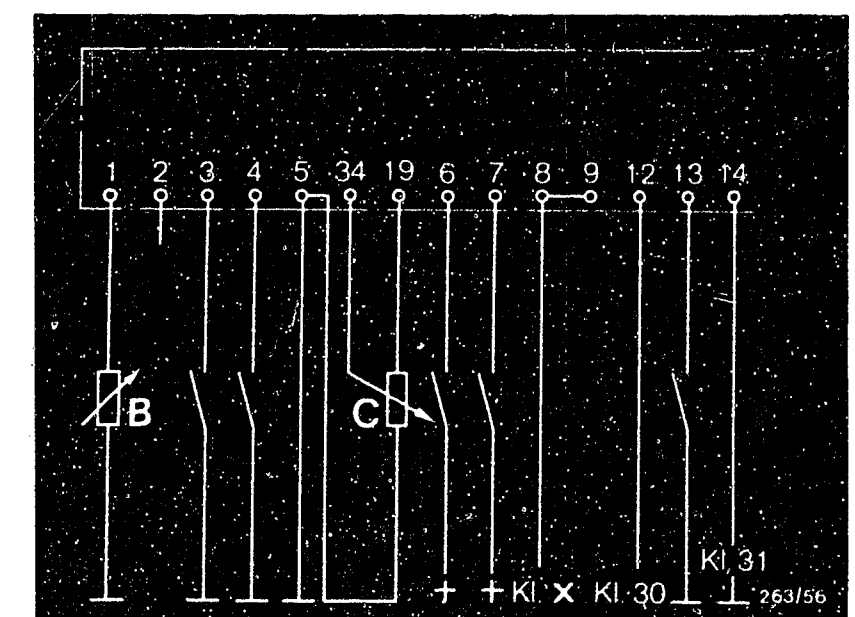
Take out and replace defective leads.

Adjustment of the fuel-consumption sensor.

With the sensor plate in its zero position (i.e., the upper edge of the sensor plate flush with the start of the cone), adjust the fuel-consumption sensor (potentiometer) in such a way that the voltage at the measuring instrument is exactly zero Volts (± 0.05 V).

The voltage must increase immediately when the sensor plate is deflected only slightly.

Tighten the fastening screws to a tightening torque of 1.5 ... 2.0 Nm, and secure with locking paint.



D5

Trouble-shooting
Instrument cluster 0 263 220 ...

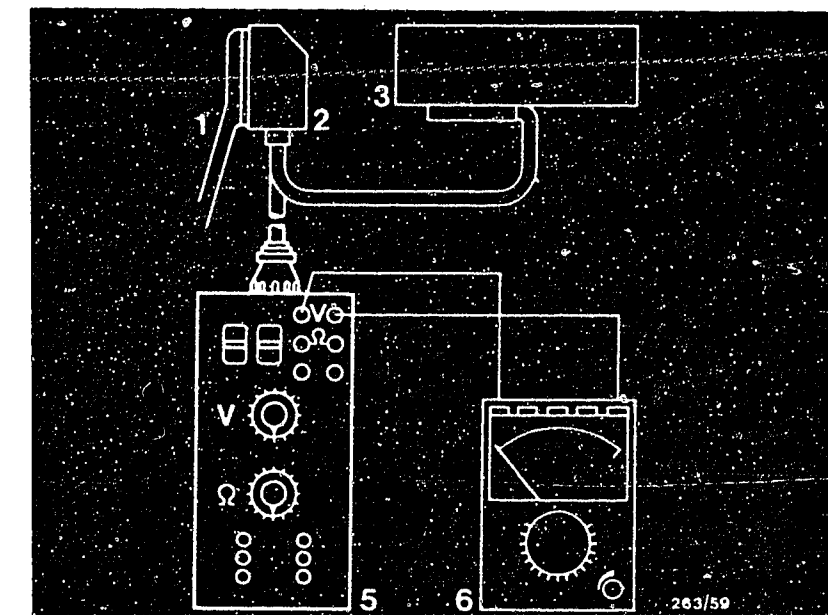


D6

Trouble-shooting
Instrument cluster 0 263 220 ...

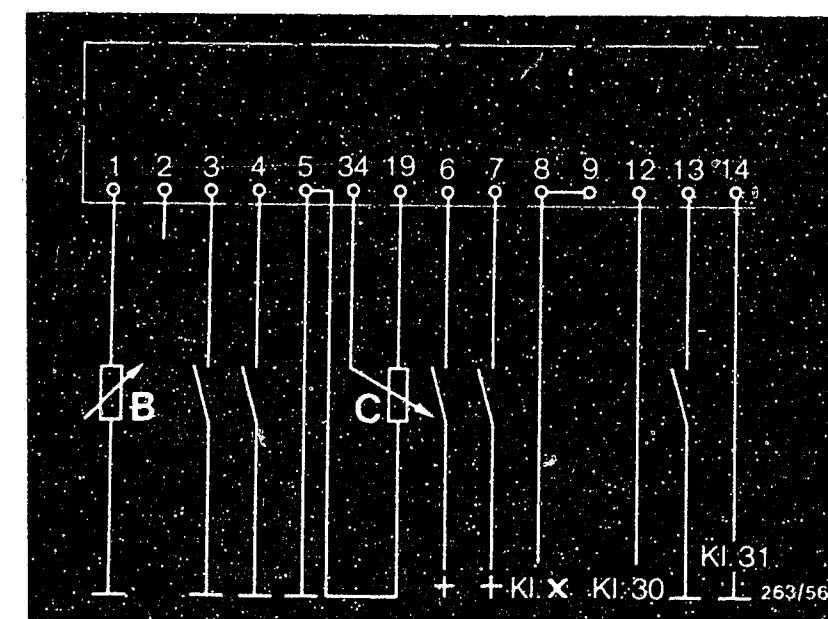


Test step 18			
Operation		Reading	Testing
<u>Program switch setting "V"</u>	13	On the multimeter: 0 - 4.5 V Depending on the engine speed, the voltage at the fuel-consumption sensor fluctuates between 0 and 4.5 V	<u>Component:</u> Measured value of the fuel-consumption sensor Pin 34
<u>Program switch setting "Ω"</u>	--		<u>Operation:</u> Measurement of voltage
<u>Test equipment:</u> Universal test adapter Multimeter			<u>Malfunction:</u> Voltage always 0 V or 5 V Reading for consumption not O.K.
<u>Range of measurement:</u> 0 ... 5 V			
<u>Connection:</u> Red test socket = + Black test socket = -			
<u>Operation in the vehicle:</u> Start the engine			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Partial connection diagram for the vehicle wiring harness to the instrument cluster



Possible defects:

The lead to Pin 34 on the instrument cluster is not connected to the fuel-consumption sensor.

Take out and replace a defective lead.

Adjustment of the fuel-consumption sensor.

With the sensor plate in its zero position (i.e., the upper edge of the sensor plate flush with the start of the cone), adjust the fuel-consumption sensor (potentiometer) in such a way that the voltage at the measuring instrument is exactly 0 Volts (± 0.05 V).

The voltage must increase immediately when the sensor plate is deflected only slightly.

Tighten the fastening screws to a tightening torque of 1.5 ... 2.0 Nm, and secure with locking paint.

D7

Trouble-shooting

Instrument cluster 0 263 220 ...



D8

Trouble-shooting

Instrument cluster 0 263 220 ...



Test step 19

Operation

Program switch setting "V"

14

Program switch setting "Ω"

--

Test equipment:

Universal test adapter
Multimeter

Range of measurement:

0 ... 5 V

Connection:

Red test socket = +
Blue test socket = -

Operation in the vehicle:

Ignition ON

Additional function:

Press the rocker switch on the left

Reading

On the multimeter:

When the rocker on the left is activated, the voltage goes from approx. 5 V to 0 V

Testing

Component:

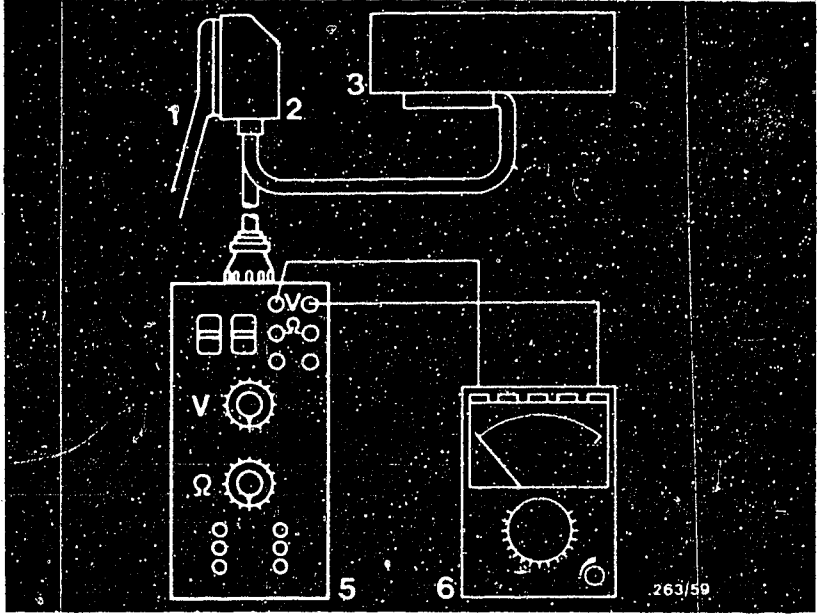
Rocker contact on the left for on-board computer
Pin 33

Operation:

Measurement of voltage

Malfunction:

If the voltage does not return to 0 V or is always 0 V.



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

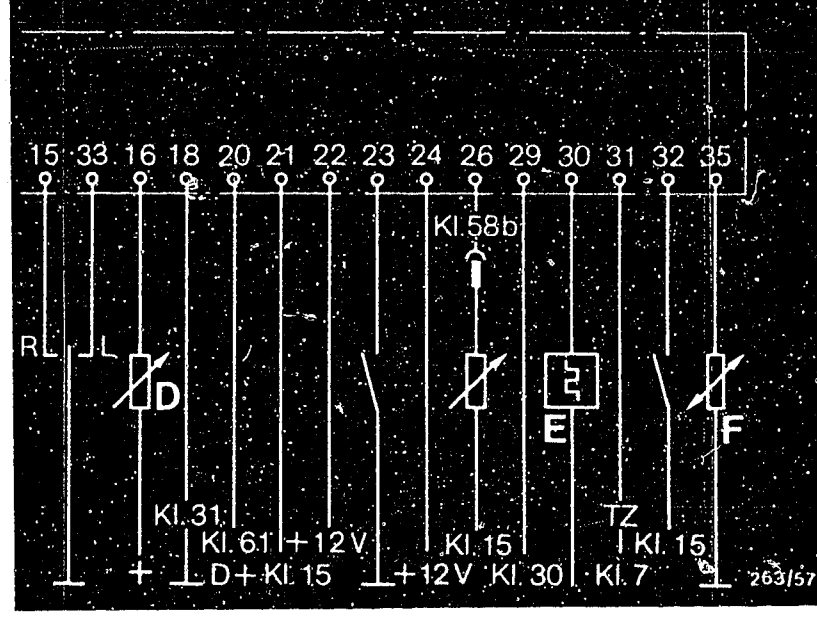
Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

The lead from the rocker switch (center rocker contact) to ground has a break or a ground short. The rocker contact is defective. There are no 5 V being applied at Pin 33 of the instrument cluster.

There is a break in the lead from Pin 33 of the instrument cluster to the rocker switch.

Take out and replace a defective lead or rocker contact.



D9

Trouble-shooting
Instrument cluster 0 263 220 ...

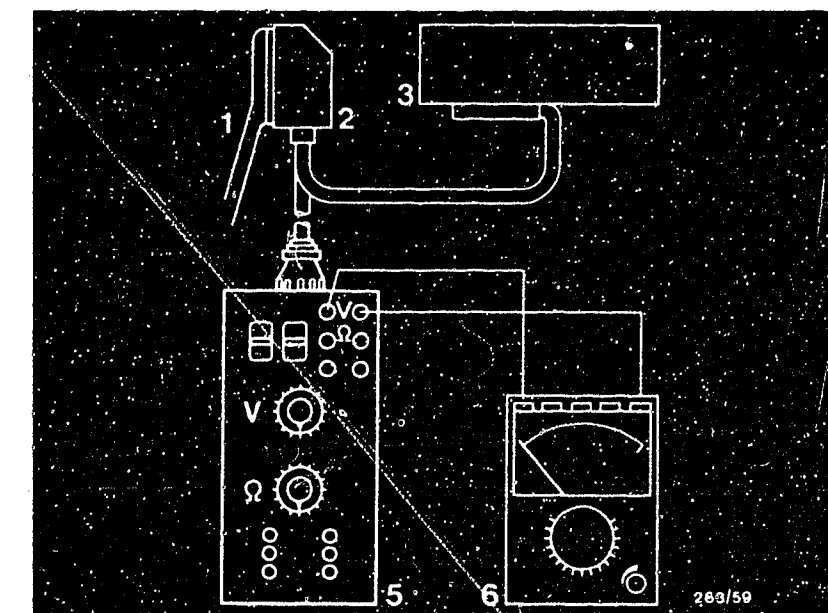


D10

Trouble-shooting
Instrument cluster 0 263 220 ...



Test step 20			
Operation		Reading	Testing
Program switch setting "V"	15	On the multimeter: When the rocker switch on the right is activated, the voltage goes from approx. 5 V to 0 V	<u>Component:</u> Rocker contact on the right for on-board computer Pin 15
Program switch setting "0"	--		<u>Operation:</u> Measurement of voltage
Test equipment: Universal test adapter Multimeter			<u>Malfunction:</u> If the voltage does not return to 0 V or is always 0 V.
Range of measurement: 0 ... 5 V			
Connection: Red test socket = + Black test socket = -			
Operation in the vehicle: Ignition ON			
Additional operation: Press rocker switch on right			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

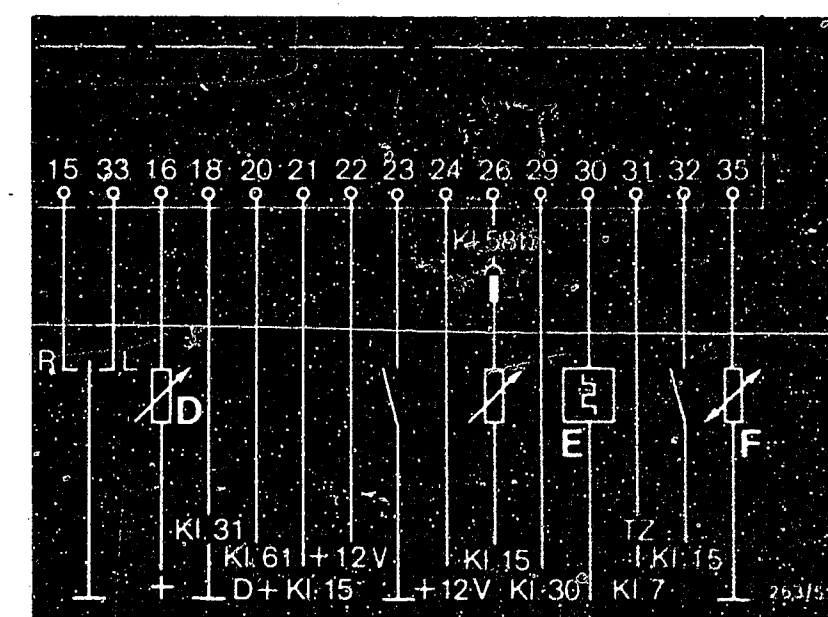
Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

The lead from the rocker switch (center rocker contact) to ground has a break or a ground short. The rocker contact is defective. There are no 5 V being applied at Pin 33 of the instrument cluster.

There is a break in the lead from Pin 15 of the instrument cluster to the rocker switch.

Take out and replace a defective lead or rocker contact.



D11

Trouble-shooting

Instrument cluster 0 263 220 ...



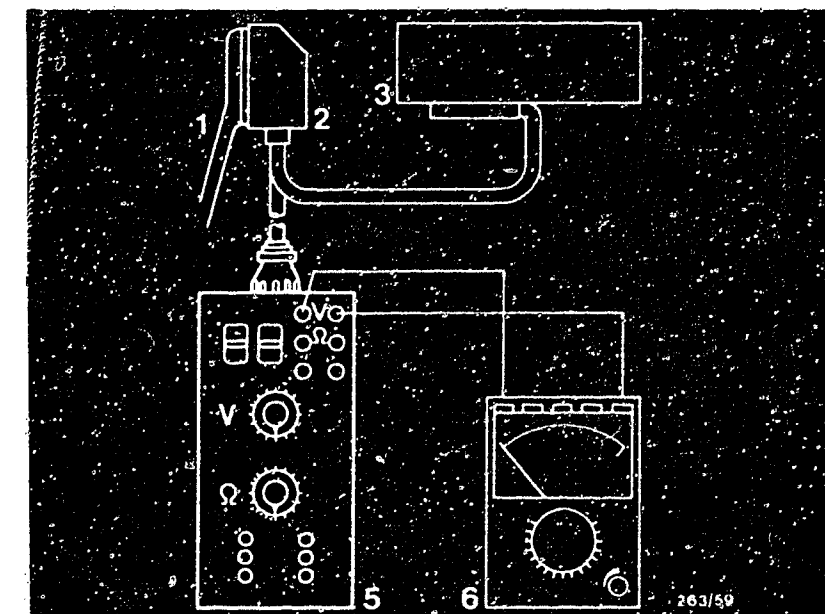
D12

Trouble-shooting

Instrument cluster 0 263 220 ...



Test step 21			
Operation		Reading	Testing
Program switch setting "V"	16	On the multimeter: When the reset button is activated, the voltage returns from approx. 5 V to 0 V.	Component: Reset button Pin 13
Program switch setting "Ω"	--		Operation: Measurement of voltage
Test equipment: Universal test adapter Multimeter			Malfunction: If the voltage does not return to 0 V or is always 0 V.
Range of measurement: 0 ... 5 V			
Connection: Red test socket = + Black test socket = -			
Operation in the vehicle: Ignition ON			
Additional operation: Press reset button			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

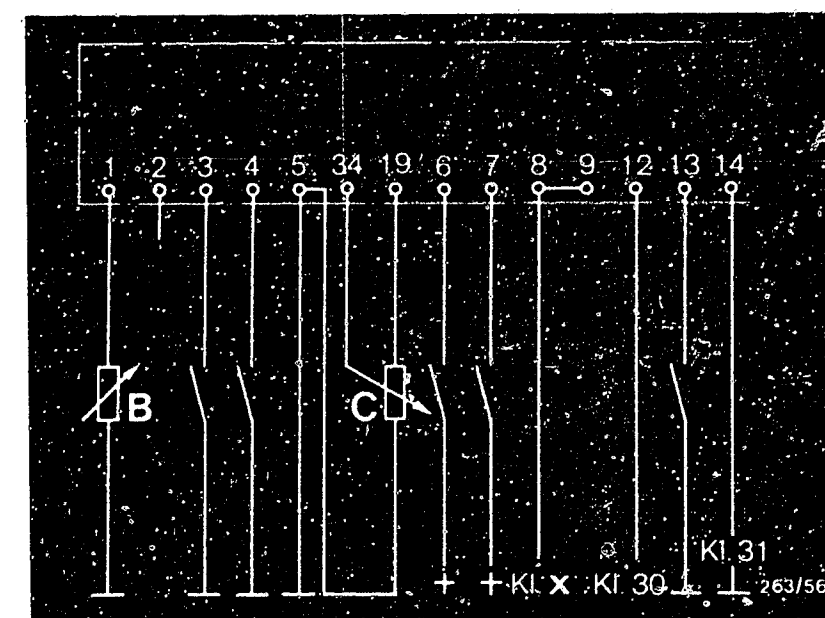
Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

There is a break in the lead from the reset button to ground.
The reset button is defective.
There are no 5 V being applied at Pin 13 of the instrument cluster.

The lead from Pin 13 of the instrument cluster to the reset button has a break.

Take out and replace a defective lead or reset button.



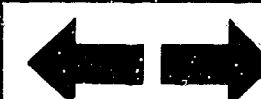
D 13

Trouble-shooting
Instrument cluster 0 263 220 ...

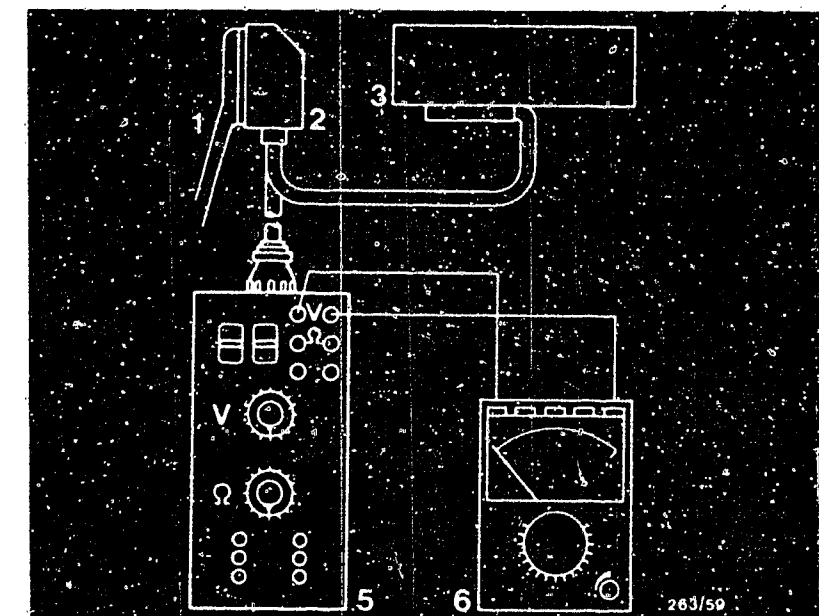


D 14

Trouble-shooting
Instrument cluster 0 263 220 ...



<u>Test step 22</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch setting "V"</u>	17	On the multimeter: When the MIN/MAX switch is activated, the voltage rises from 0 V to 12 V.	<u>Component:</u> Button for reduced-display Pin 32
<u>Program switch setting "Ω"</u>	--		<u>Operation:</u> Measurement of voltage
<u>Test equipment:</u> Universal test adapter Multimeter			<u>Malfunction:</u> If the voltage does not rise to V _{battery}
<u>Range of measurement:</u> 0 ... 15 V			
<u>Connection:</u> Red test socket = + Black test socket = -			
<u>Operation in the vehicle:</u> Ignition ON			
<u>Additional operation:</u> Press MIN/MAX switch			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

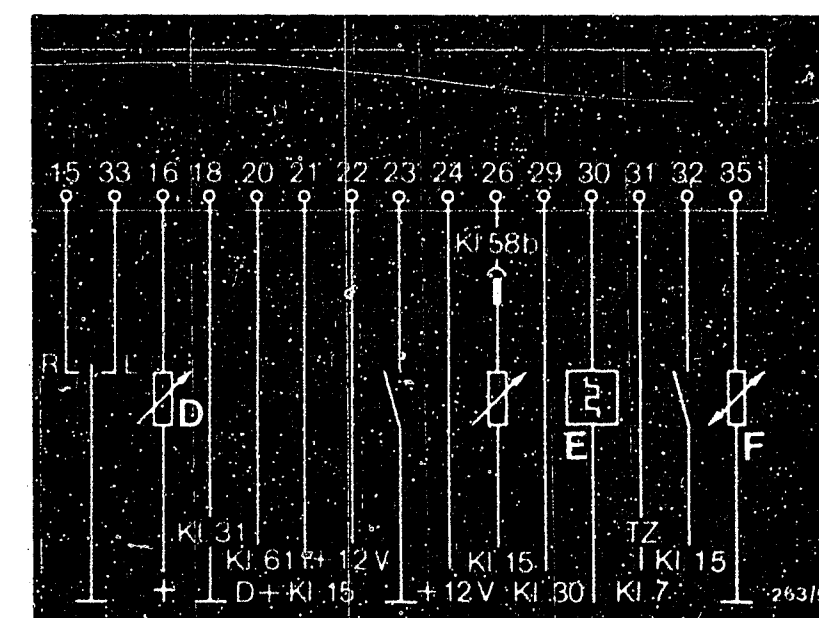
Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

The lead from the button for reduced display to Pin 15 has a break.
Button is defective.

The lead from Pin 32 of the instrument cluster to the button for reduced display has a break.

Take out and replace defective leads or button for reduced display.



D15

Trouble-shooting
Instrument cluster 0 263 220 ...

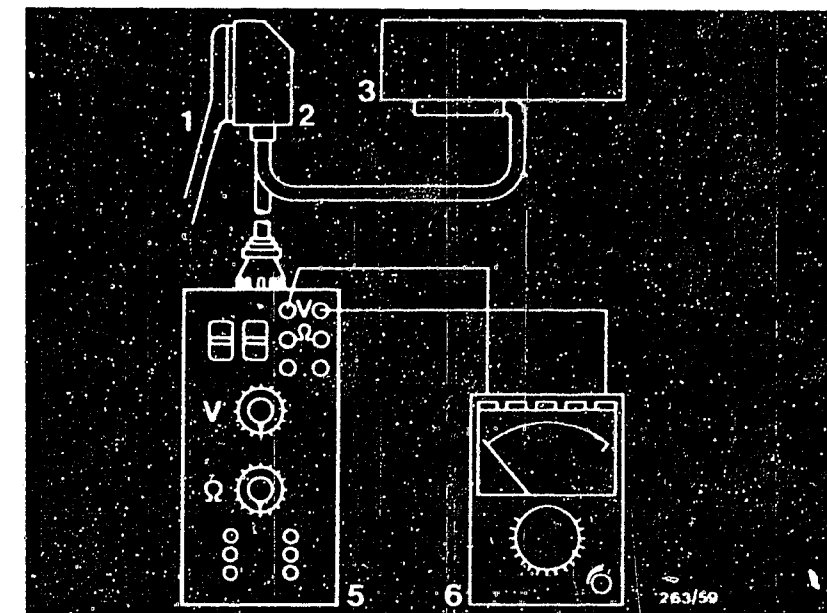


D16

Trouble-shooting
Instrument cluster 0 263 220 ...



Test step 23			
Operation		Reading	Testing
Program switch setting "V"	18	On the multimeter: approx. 12 V	<u>Component:</u> Indicator light for rear fog warning light Pin 24
Program switch setting "Ω"	--		<u>Operation:</u> Measurement of voltage
Test equipment: Universal test adapter Multimeter			<u>Malfunction:</u> At 0 V
Range of measurement: 0 ... 15 V			
Connection: Red test socket = + Black test socket = -			
Operation in the vehicle: Switch on driving lights			
Additional operation: Switch on rear fog warning light.			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

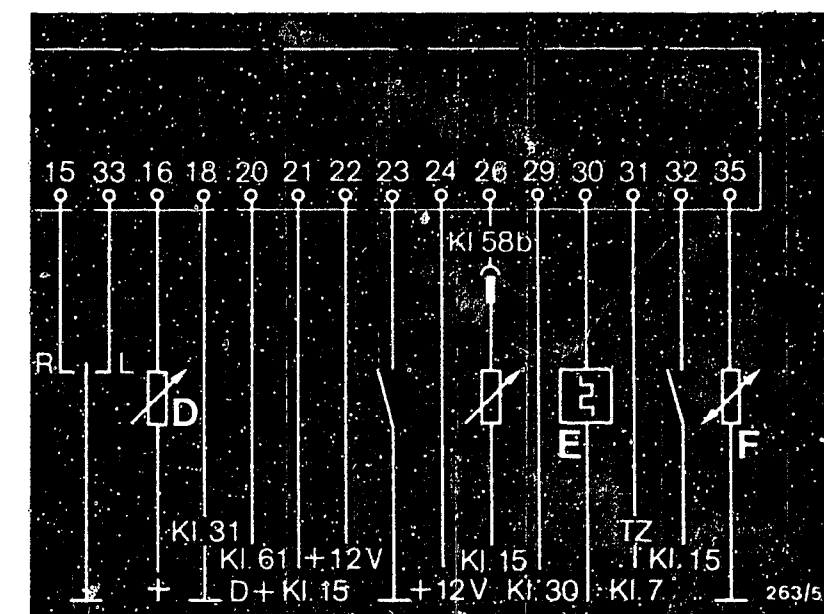
Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

The lead from the switch for the rear fog warning light to Pin 24 of the instrument cluster has a break or short-circuit.

The indicator light in the instrument cluster is defective.

Take out and replace a defective lead or indicator light in the instrument cluster.



D17

Trouble-shooting
Instrument cluster 0 263 220 ...

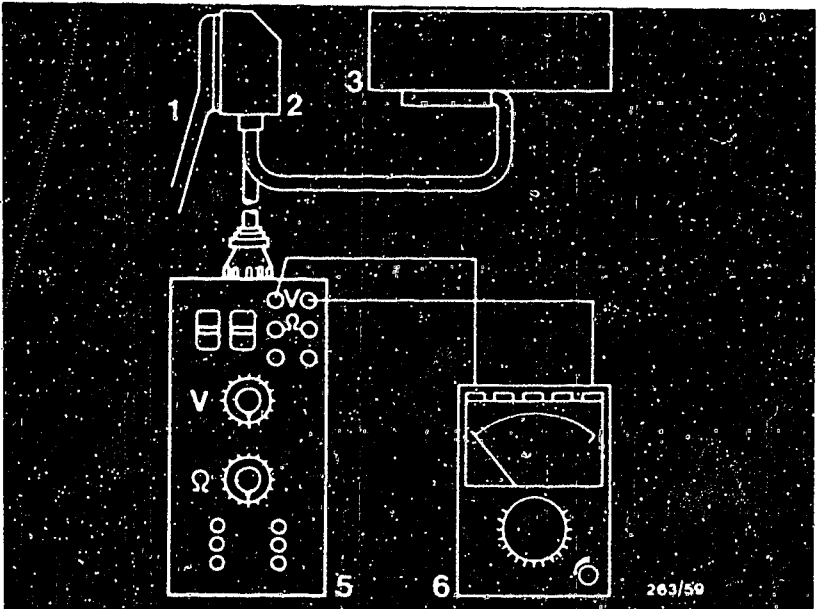


D18

Trouble-shooting
Instrument cluster 0 263 220 ...



Test step 24			
Operation		Reading	Testing
Program switch setting "V"	19	On the multimeter: 12 V	Component:
Program switch setting "Ω"	--		Indicator light for the hazard-warning flasher Pin 6
Test equipment: Universal test adapter Multimeter			Operation:
Range of measurement: 0 ... 15 V			Measurement of voltage
Connection: Red test socket = + Black test socket = -			Malfunction:
Operation in the vehicle: Switch on the hazard-warning system			At 0 V

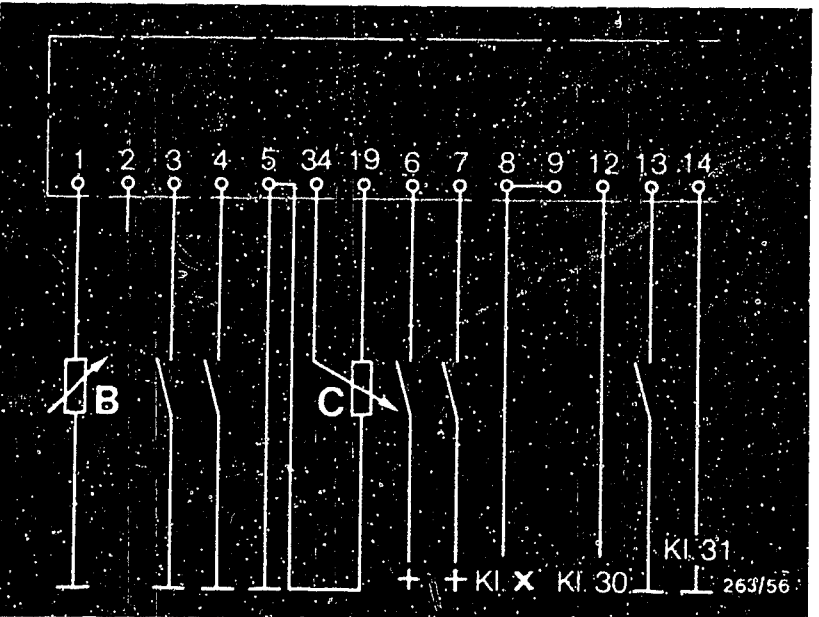


- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

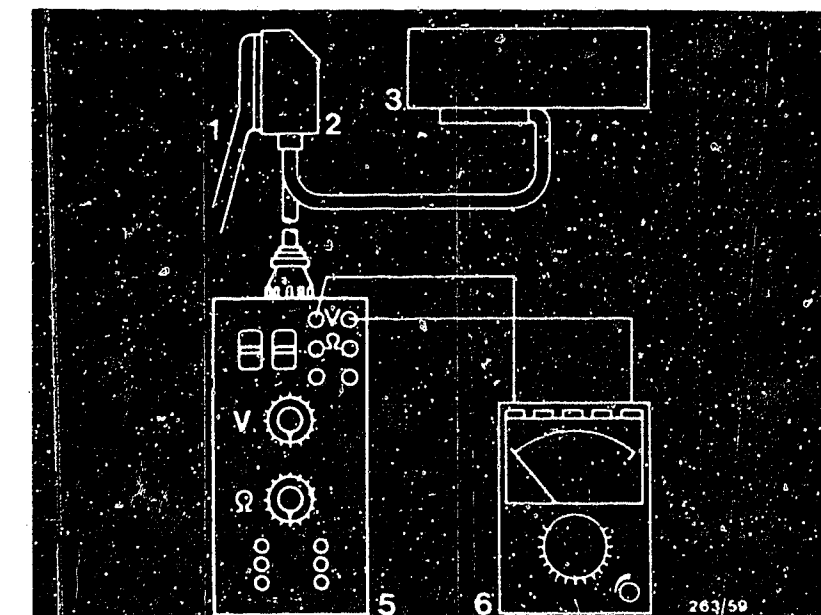
Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

- The lead from the hazard-warning flasher to Pin 6 on the instrument cluster has a break/short-circuit.
- The indicator light for the hazard-warning flasher is defective.
- Take out and replace defective leads or indicator light for the hazard-warning flasher.



Test step 25			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch setting "V"</u>	20	On the multimeter: approx. 12 V	<u>Component:</u> Indicator light for the heated rear window Pin 22
<u>Program switch setting "Ω"</u>	--		
<u>Test equipment:</u> Universal test adapter Multimeter			<u>Operation:</u> Measurement of voltage
<u>Range of measurement:</u> 0 ... 15 V			
<u>Connection:</u> Red test socket = + Black test socket = -			<u>Malfunction:</u> At 0 V
<u>Operation in the vehicle:</u> Switch on the heated rear window			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

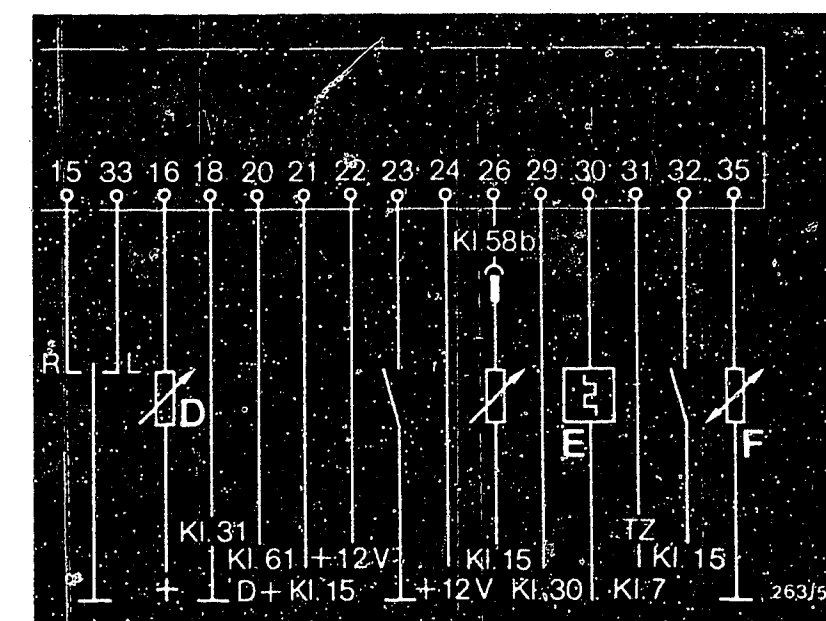
Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

The lead from the switch for the heated rear window to Pin 22 of the instrument cluster has a break or short-circuit.

The indicator light for the heated rear window is defective.

Take out and replace defective leads or indicator light for the heated rear window.



D21

Trouble-shooting

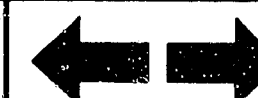
Instrument cluster 0 263 220 ...



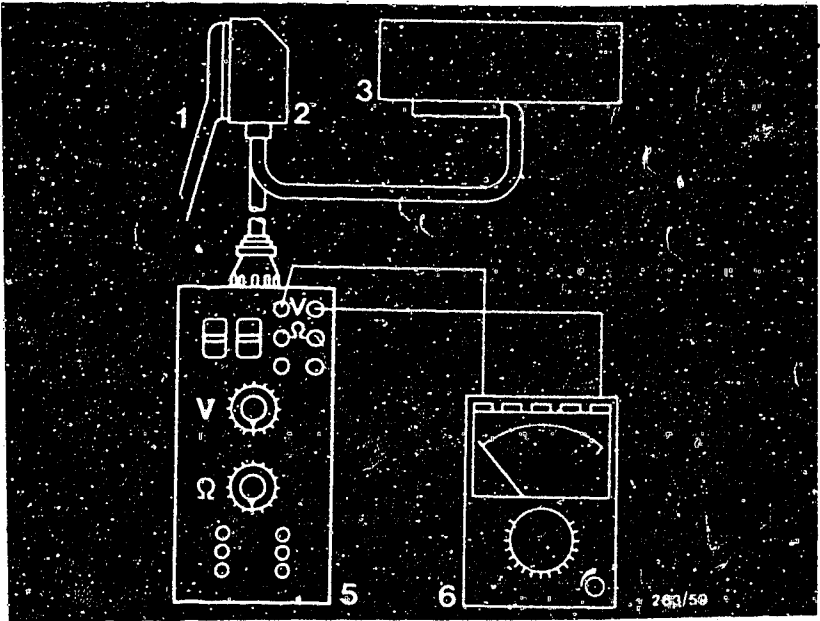
D22

Trouble-shooting

Instrument cluster 0 263 220 ...



Test step 26			
Operation		Reading	Testing
Program switch setting "V"	21	On the multimeter: approx. 12 V	<u>Component:</u> Indicator light for high beam Pin 7
Program switch setting "Ω"	--		
<u>Test equipment:</u> Universal test adapter Multimeter			<u>Operation:</u> Measurement of voltage
<u>Range of measurement:</u> 0 ... 15 V			<u>Malfunction:</u> At 0 V
<u>Connection:</u> Red test socket = + Black test socket = -			
<u>Operation in the vehicle:</u> Switch on ignition.			
<u>Additional operation:</u> Switch on high beam light			



- 1 = 35-pin connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

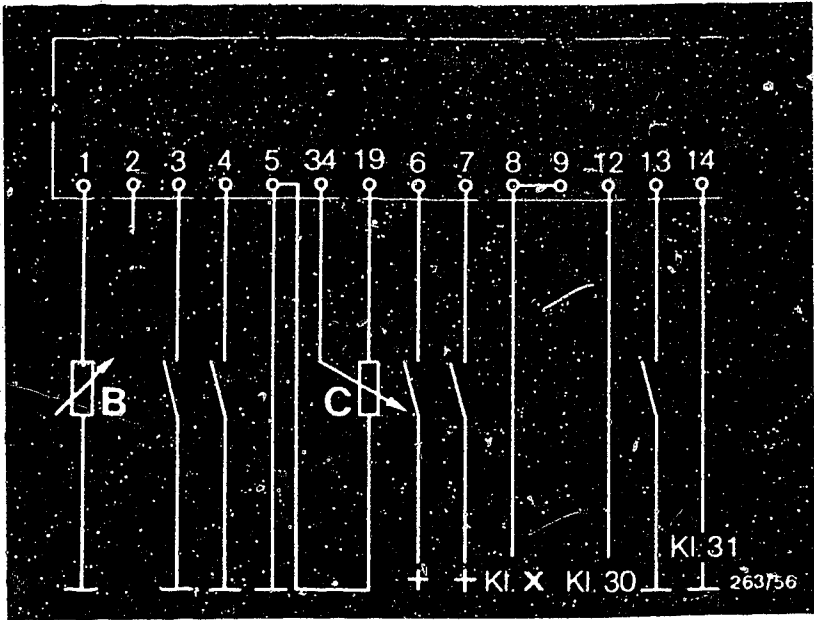
Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

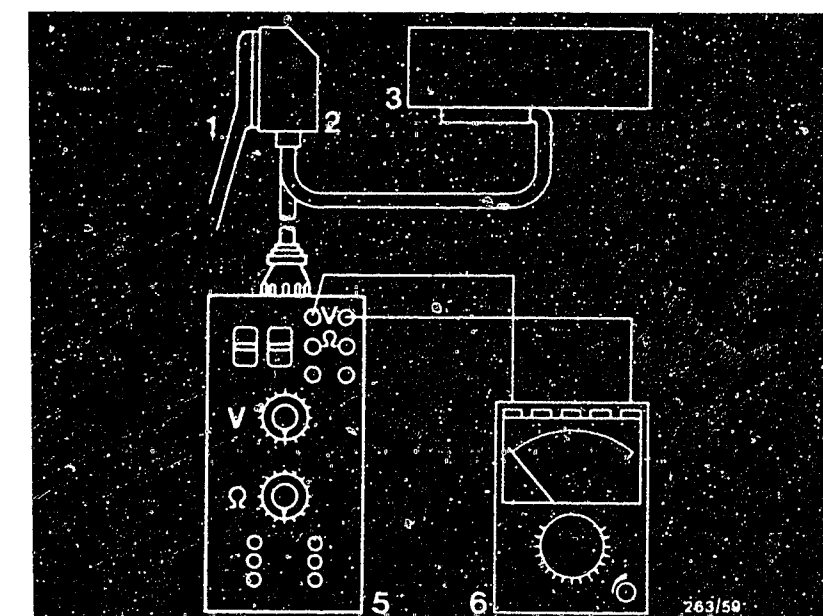
The lead from the high beam switch to Pin 7 on the instrument cluster has a break or short-circuit.

The indicator light for high beam light is defective.

Take out and replace defective leads or high beam indicator light.



<u>Test step 27</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch setting "V"</u>	22	On the multimeter: <u>12 V → 0 V</u> (in rhythm with the flashing frequency)	<u>Component:</u> Indicator for turn-signal Pin 23
<u>Program switch setting "0"</u>	--		
<u>Test equipment:</u> Universal test adapter Multimeter			<u>Operation:</u> Measurement of voltage
<u>Range of measurement:</u> 0 ... 15 V			<u>Malfunction:</u> Constant at 0 V or 12 V
<u>Connection:</u> Red test socket = + Black test socket = -			
<u>Operation in the vehicle:</u> Ignition ON			
<u>Additional operation:</u> Activate the turn-signal			



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Partial connection diagram for the vehicle wiring harness to the instrument cluster

Possible defects:

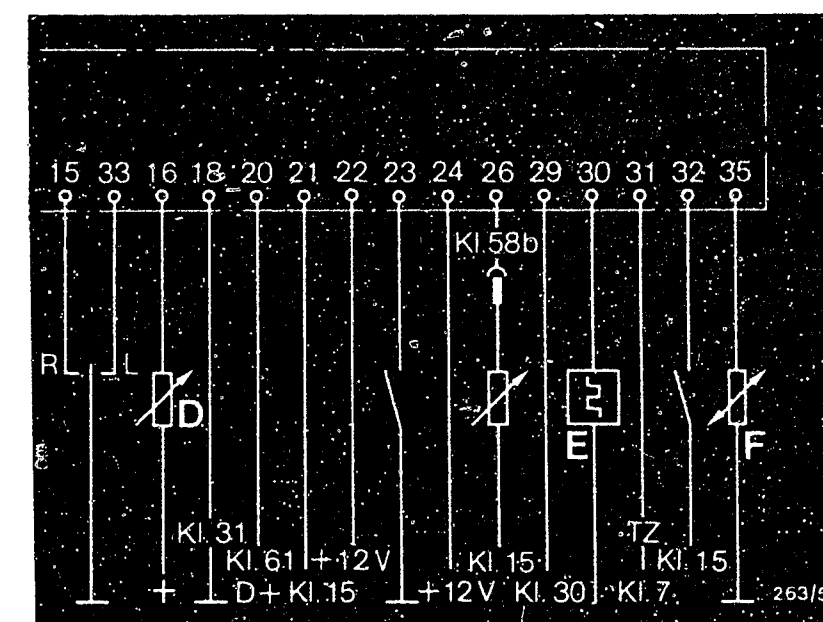
The lead from the turn-signal relay to Pin 23 of the instrument cluster has a break or short-circuit.

The indicator light for the turn-signal is defective.
The turn-signal flasher is defective.

Note:

The turn-signal flasher is fastened by means of a spring to a bracket on the back of the instrument cluster.

Take out and replace defective leads, turn-signal indicator light, and/or turn-signal flasher.



E1

Trouble-shooting

Instrument cluster 0 263 220 ...



E2

Trouble-shooting

Instrument cluster 0 263 220 ...



Test step 28

Operation

Program switch
setting "V"

23

Program switch
setting "Ω"

--

Test equipment:
Universal test adapter
Multimeter

Range of
measurement: 0 ... 15 V

Connection:

Red test socket = +

Black test socket = -

Operation in the vehicle:

Activate brightness
control

Reading

On the multimeter:

6 - 12 V

Testing

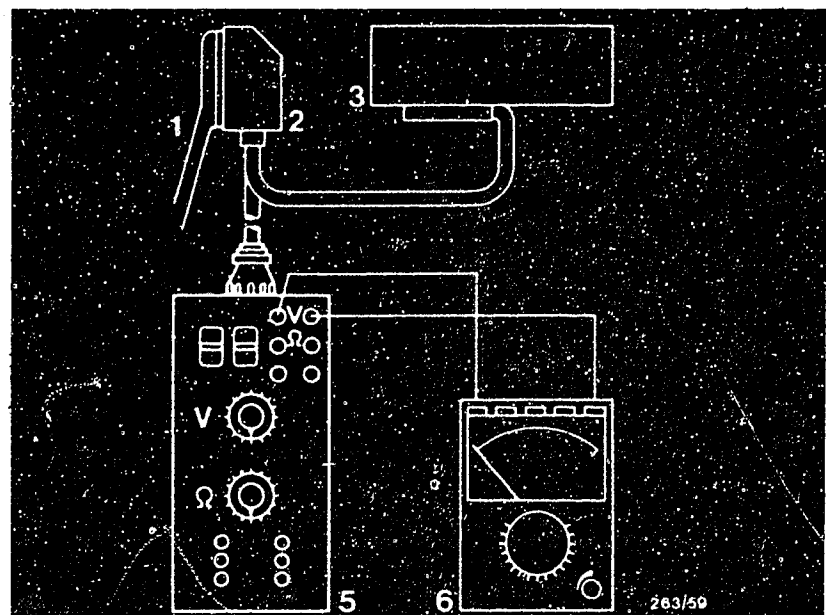
The display brightness
control on the
instrument cluster
Pin 26

Operation:

Measurement of voltage

Malfunction:

If the voltage does not
change.



- 1 = 35-pole connector to the vehicle wiring harness
- 2 = Adapter lead
- 3 = Instrument cluster
- 4 = Universal test adapter
- 5 = Multimeter

Partial connection diagram for the vehicle wiring harness to the instrument cluster

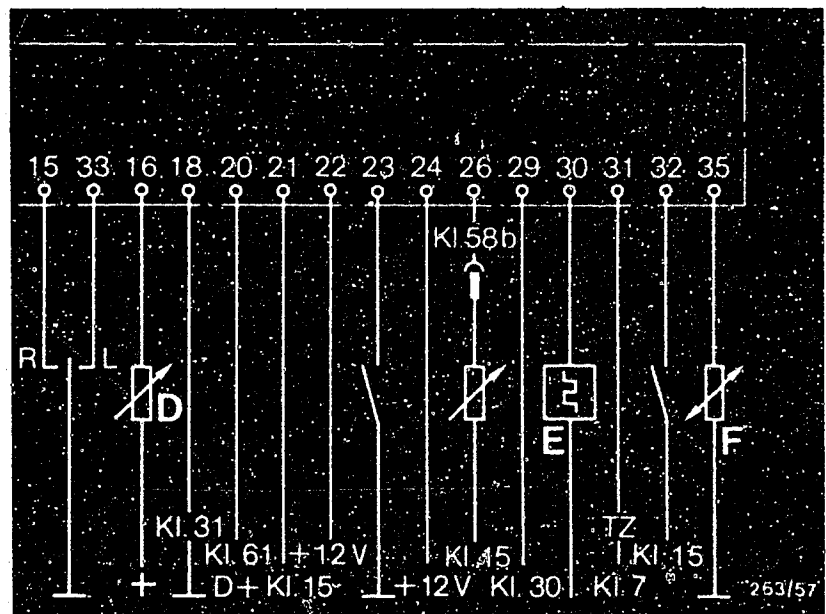
Possible defects:

The lead from the display brightness control (Term. 58b) to Pin 26 on the instrument cluster has a break or a short-circuit.

The display brightness control is defective.

The instrument cluster is defective.

Take out and replace a defective lead, display brightness control, or instrument cluster.



E3

Trouble-shooting

Instrument cluster 0 263 220 ...

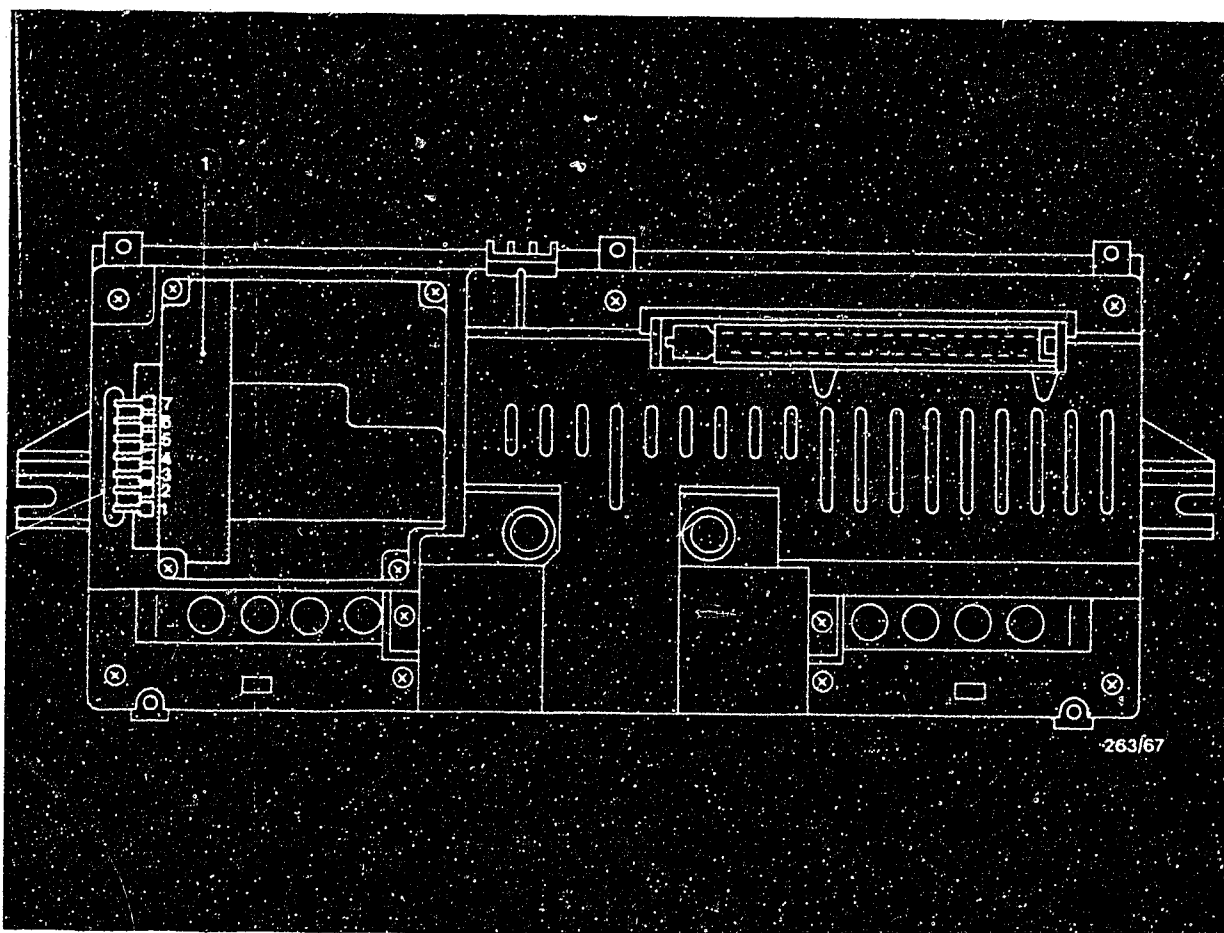


E4

Trouble-shooting

Instrument cluster 0 263 220 ...





1 = Voltage transformer on the instrument cluster
(back)

9. Checking the voltage transformer

If the instrument cluster does not light after "ignition on", the voltage transformer can be defective.

If a voltage value is not attained, take out and replace the voltage transformer.

To do this, take out the instrument cluster. Do not separate it from the vehicle wiring harness.

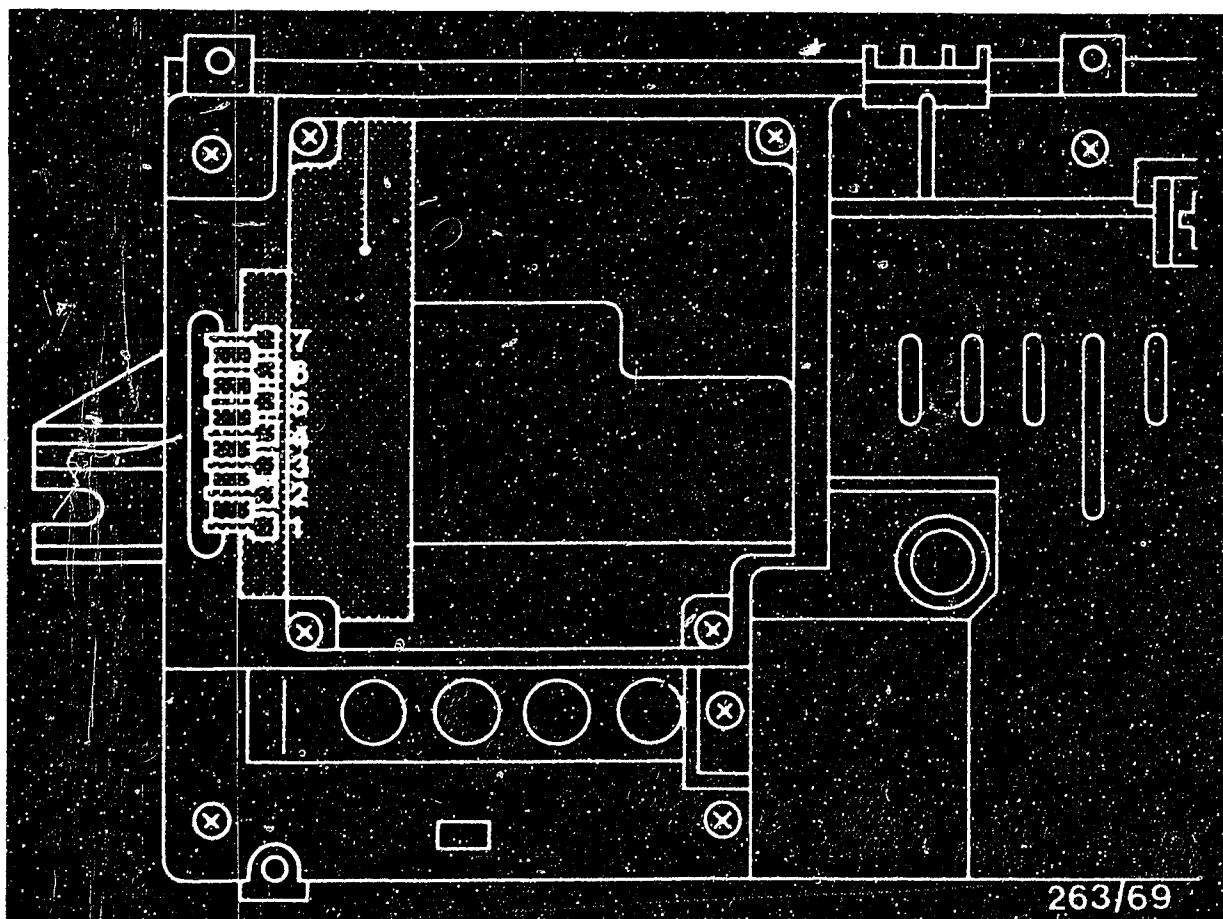
Turn the instrument cluster in such a way that measurements can be taken on the voltage transformer.

Release the fastening screws for the voltage transformer somewhat, and pull out the cover sheet (if there is one).

Retighten the fastening screws.

Be certain to do the measurements in the proper order.





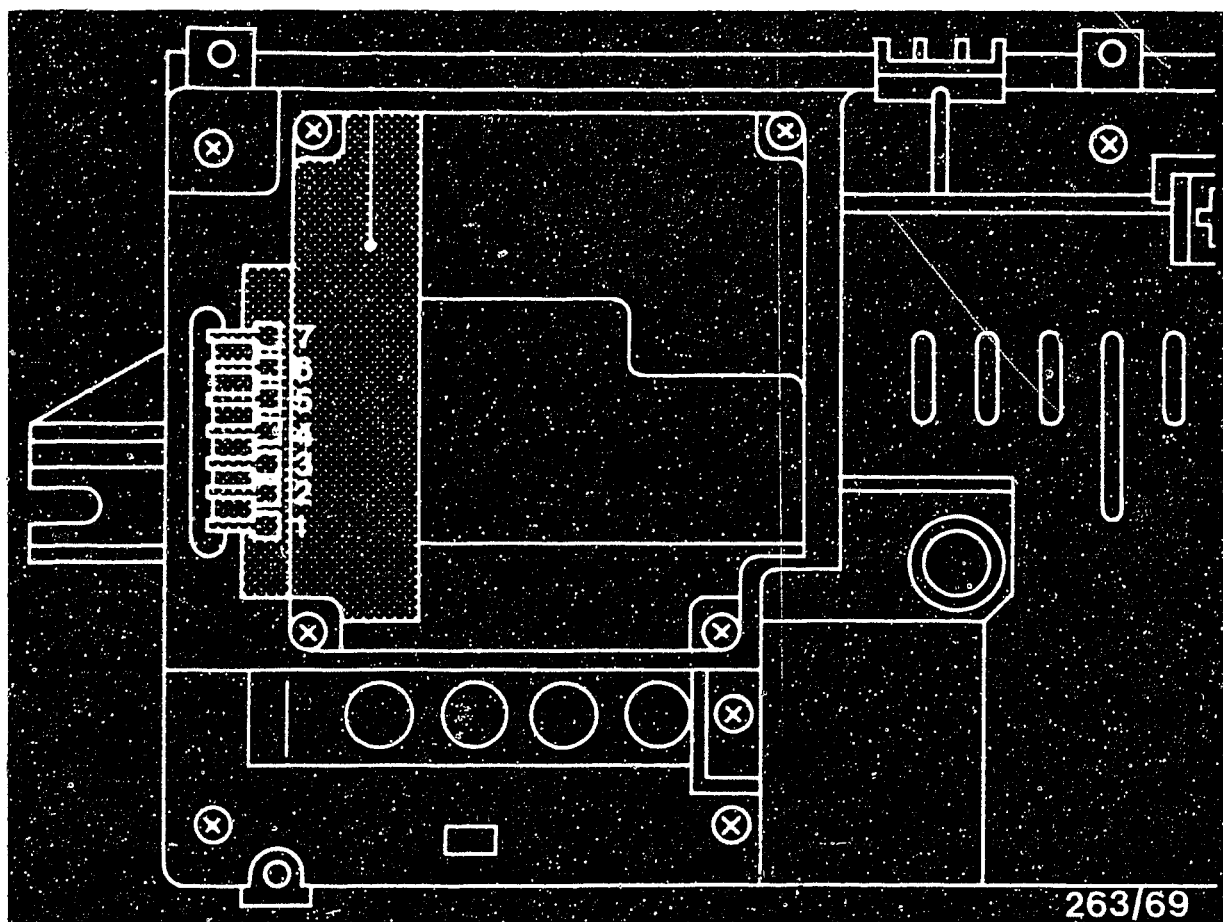
- | | | | |
|--------------|--------------|--------|-----------|
| 1 = V_D | 3 = Term. 31 | 5 = F | 7 = V_k |
| 2 = Term. 15 | 4 = V_V | 6 = F' | |

Sequence of measurements on the voltage transformer (Bosch)

1. $V_V = 5$ V, measured to Term. 31 (ground).
(The voltage V_V is produced in the instrument cluster. The voltage transformer is supplied with it.)
If the specified value is not attained on the voltage transformer, the instrument cluster is defective.
2. $V_k = 26 \dots 29$ V, measured to V_V
3. Term. 15 measured to Term. 31 = 12 V
4. $V_D = 11$ V, measured to Term. 31
5. F measured to F' = 3 - 4 V (AC voltage)

Caution: Do not jump F and F' during measurement, since the voltage transformer is destroyed immediately if that is done.





1 = V_D 3 = Term.31 5 = F 7 = V_k
 4 = V_V 6 = F'

Sequence for measurements on the voltage transformer (TDK)

1. $V_V = 5 \text{ V}$, measured to Term. 31 (ground)
 (The voltage V_V is produced in the transformer. The voltage transformer is supplied with it.)
 If the specified value is not attained on the voltage transformer, the transformer is defective.
2. $V_k = 26 \dots 29 \text{ V}$, measured to V_V .
3. $V_D = 11 \text{ V}$, measured to Term. 31
4. F measured to F' = 3 - 4 V (AC voltage)

Caution: Do not jump F and F' during measurements, because the voltage transformer is destroyed immediately if that is done.



10. Checking the speech synthesizer module

Pull on the handbrake lightly.

Start the engine, and, with the handbrake pulled lightly, drive approx. 3 m.

The following message must now be given by the speech synthesizer module:

"Caution! Release handbrake."

At the same time, the warning light must come on (switched on by the speech synthesizer module).



11. Adjusting the fuel gauge display, with instrument cluster taken out

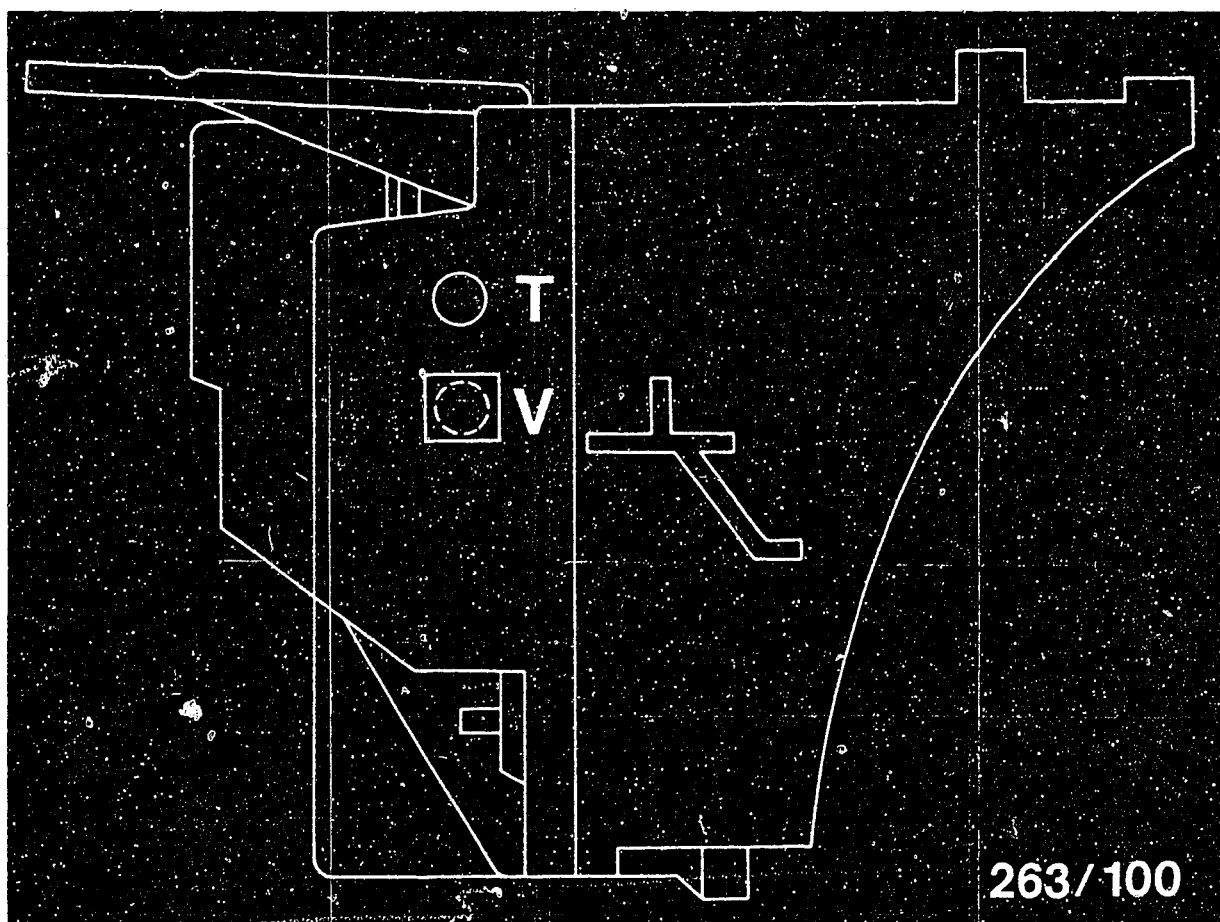
If the fuel gauge sensor or the fuel tank has been taken out and replaced, the fuel gauge display must be re-adjusted.

- When working on the fuel system, follow accident prevention regulations and environmental and health regulations.

1. Replace the + connection to the electric fuel pump with a provisional lead.
Disconnect the fuel hose from the fuel pump, put on a separate hose, and direct it into a fuel canister. Connect the provisional electrical lead to the battery.
The fuel tank is pumped dry.

2. Put exactly 10 l into the fuel tank.
Switch on the ignition, do not start the engine.
Select the range function using the rocker switch on the on-board computer.
Press the switch and hold it for 2 seconds.
The fuel gauge damping is now switched off and the fuel gauge can be calibrated to 7 l.





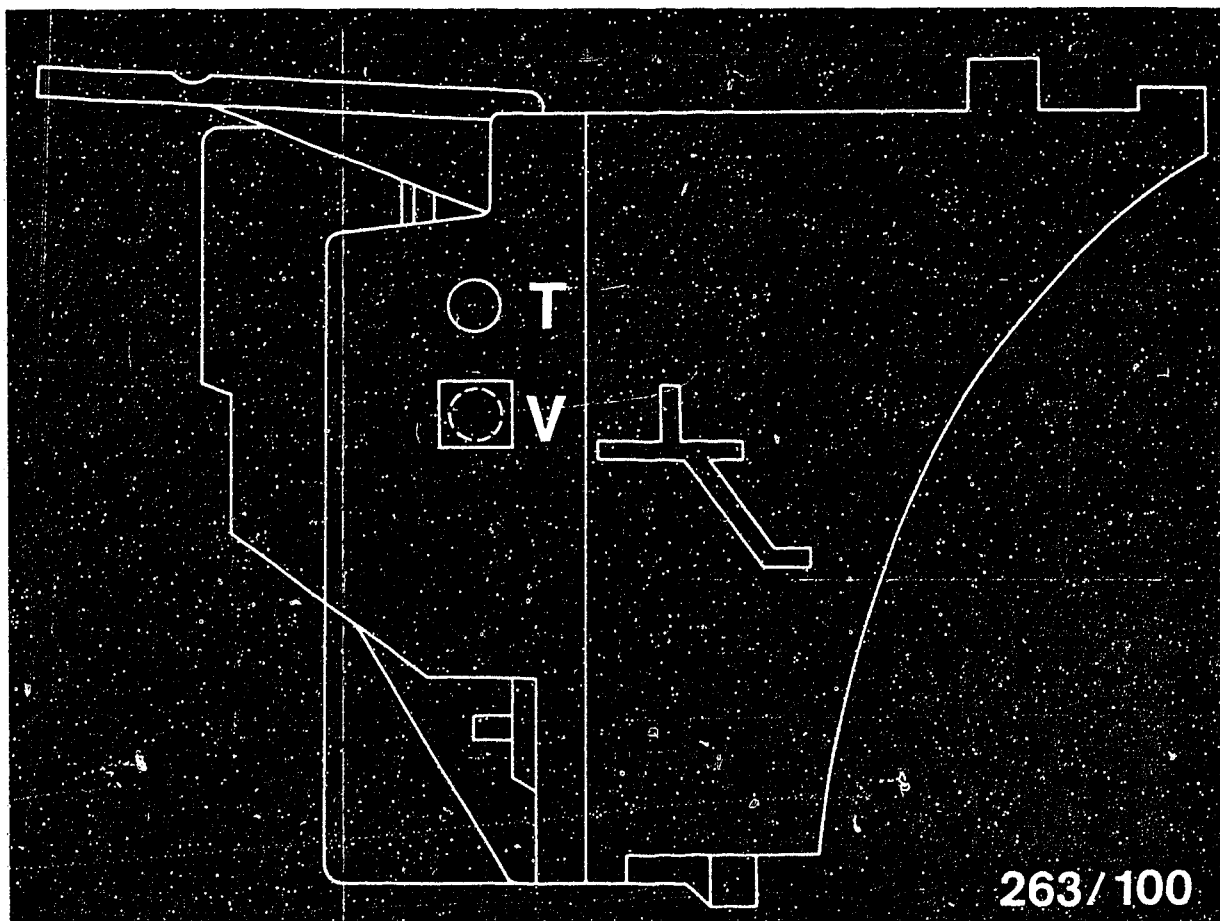
Adjusting the fuel gauge display (continued)

3. With the instrument cluster taken out, use an adjusting wrench to turn potentiometer "T" (see the Figure) in such a way that the fuel gauge display indicates exactly 7 ltrs.

Note:

During adjustment, press the reset button (fuel gauge display without delay).





12. Adjusting the consumption display (Ø L/100 km)

If the customer complains about incorrect display of fuel consumption - e.g., 10 % too much - the display for consumption can be readjusted:

Take out the instrument cluster.

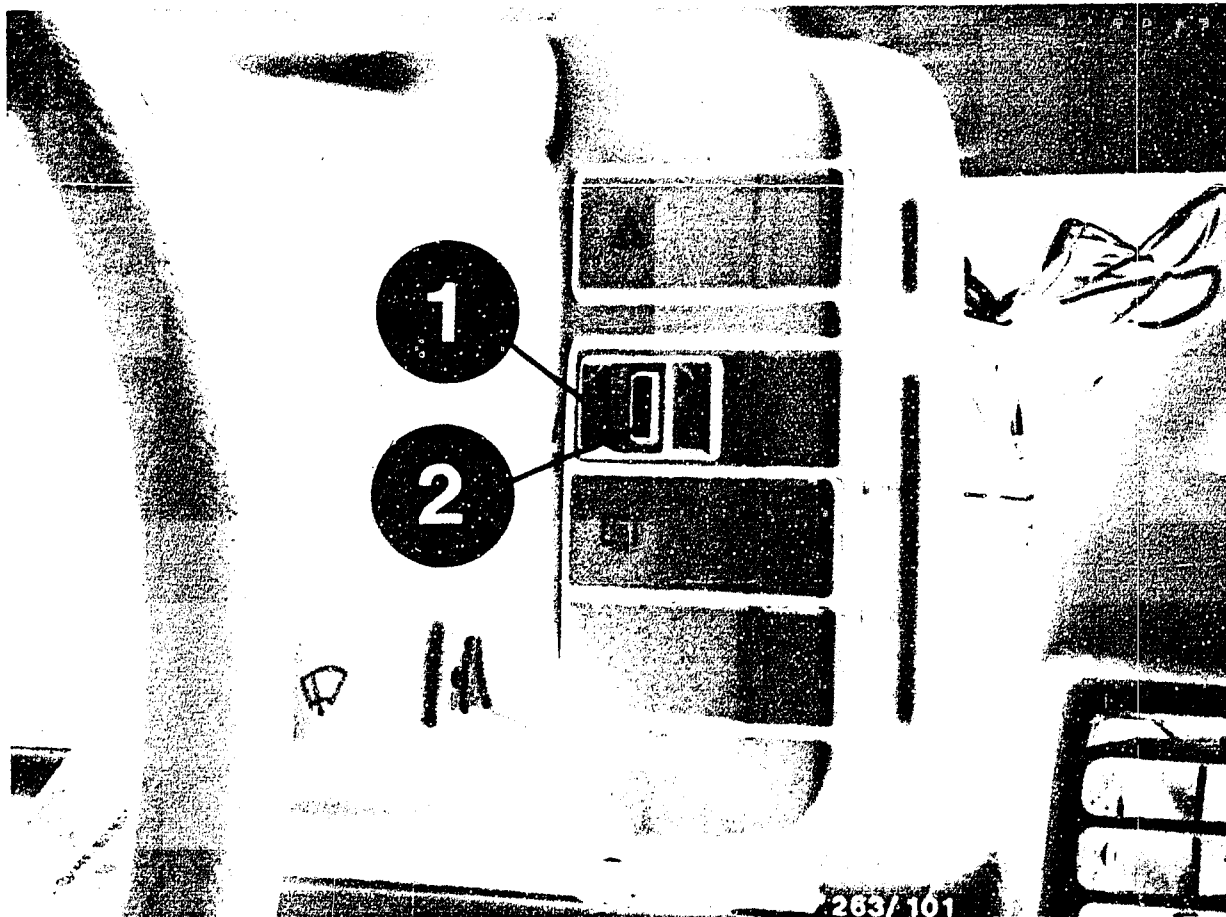
Raise the vehicle on a lifting platform until its wheels are off the ground.

Start the vehicle and switch on the differential locks. (Pull up the two levers on the left and on the right of the handbrake.)

Accelerate the vehicle in 1st gear until the reading for consumption is Ø 10 l. Then turn potentiometer "V" (see the Figure) so that the correct reading appears.

In the example given, 9 l (10 l - 10 %).

After adjustment, cover the hole with a sticker.



1 = Rocker switch

2 = Reset button

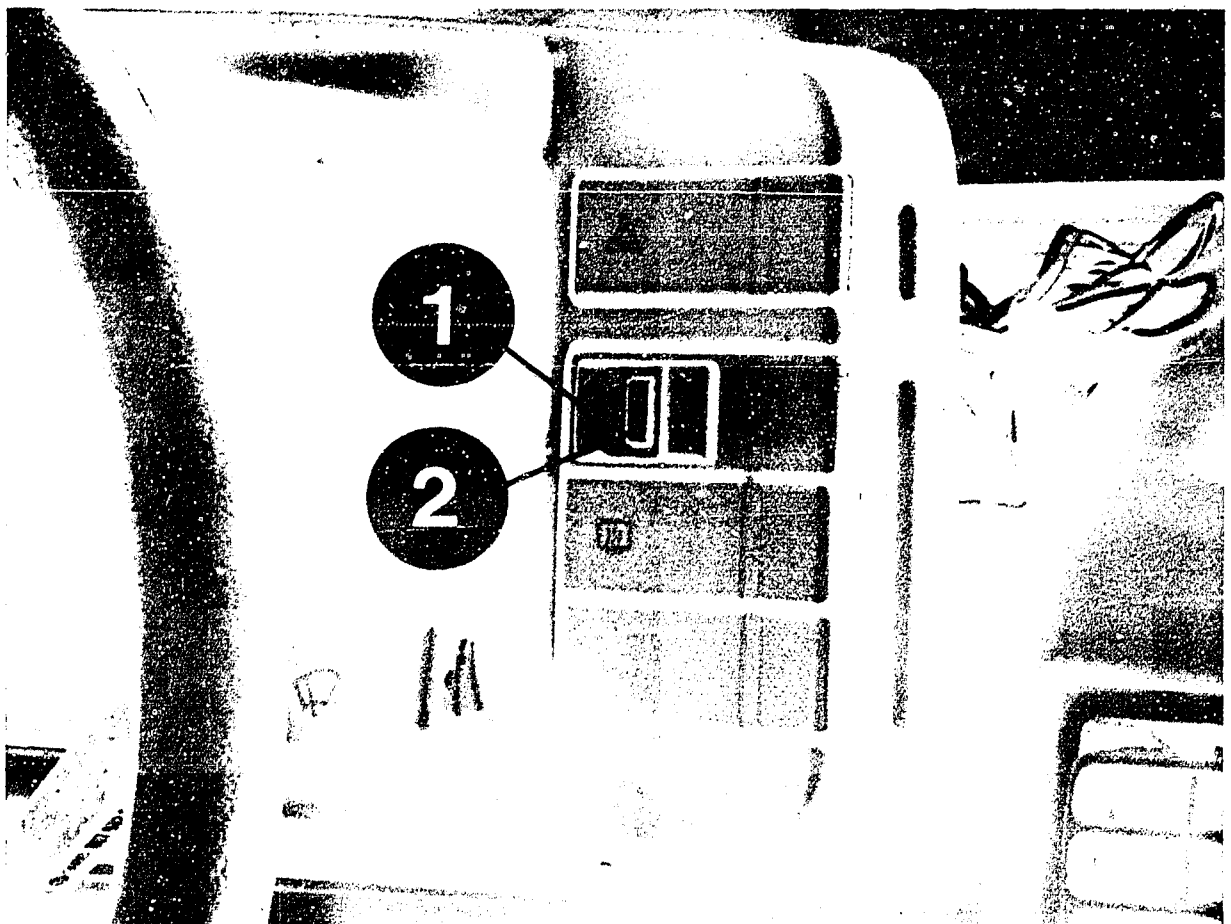
13. Setting the time

Using the on-board computer rocker switch, select the time-of-day function.

Press the rocker switch on the right for approx. 3 sec. until the reading for hours flashes.

Now adjust the hours using the reset button.





1 = Rocker switch

2 = Reset button

Adjusting the display for minutes:

Press the rocker on the right. The display for minutes flashes.

Using the reset button, set to the correct current minute.

Wait until the time tone. The next minute starts now.

Press the reset button once more.

With that, the time of day has been set accurate to the second.

The minute display is now advanced by 1 minute and is simultaneously stored.

The minute display continues flashing.

Press the rocker switch on the left twice.

The display no longer flashes (lights continuously).

The time function has been selected.



14. Checking the conversion miles → kilometers

The on-board computer must be in the time-of-day setting setting.

Press the reset button long enough (≥ 2 sec.) so that the instrument cluster indicates kilometers instead of miles.

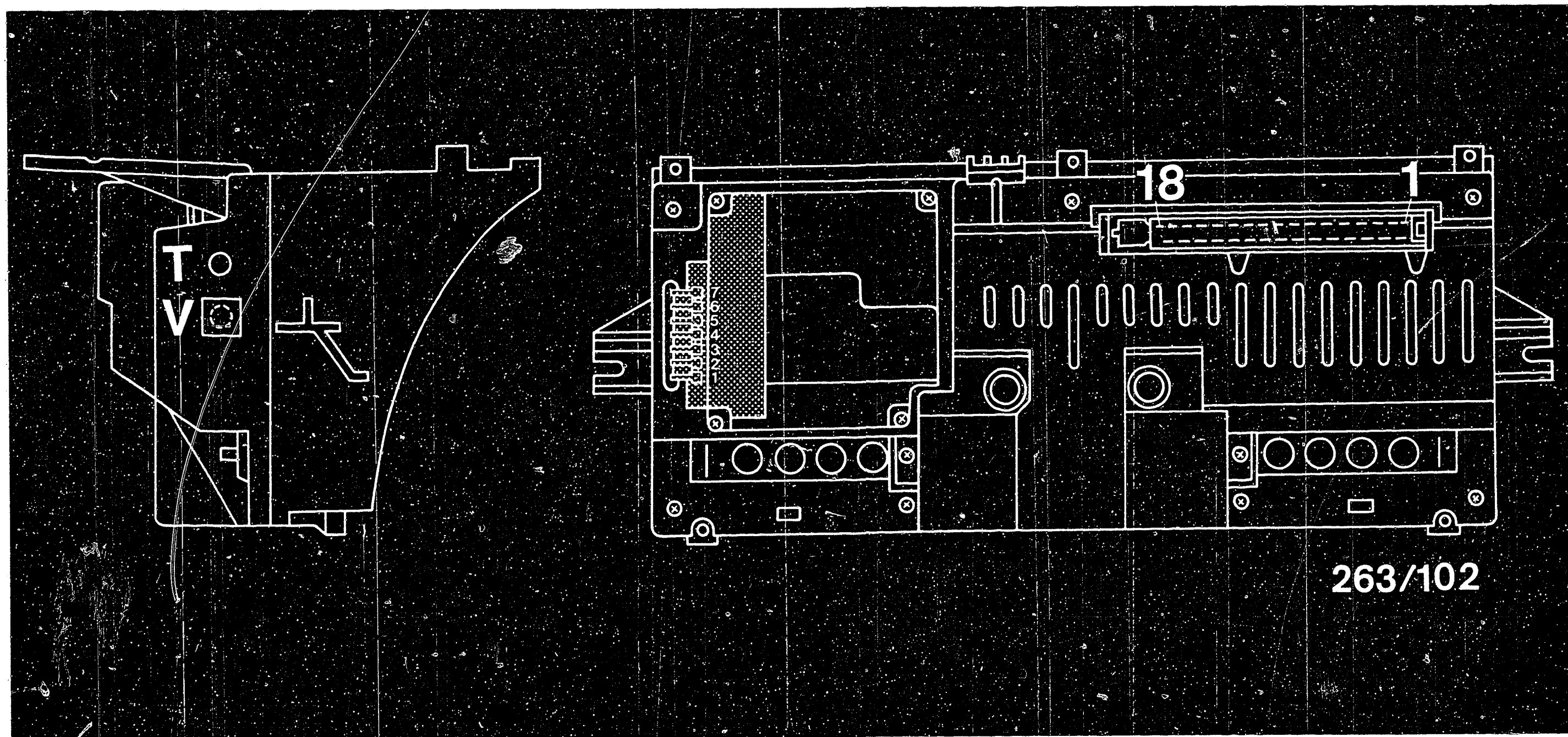
Pressing on the button again causes a switch back to miles.

E14

Checking conversion, miles → kilometers

Instrument cluster 0 263 220 ...





263/102

15. Notes on taking out and replacing an instrument cluster

1. Setting the consumption display on the new instrument cluster: measure the resistance on the old instrument cluster between pins 2 and 18 (ground). Set that value on the new instrument cluster using potentiometer "V". After adjustment, cover up potentiometer "V" once again.
2. Adjusting the fuel gauge display on the new instrument cluster: take reading for fuel level with the old instrument cluster connected and the ignition switched on. After connecting the new instrument cluster, set the value read (on the old instrument cluster) on the new instrument cluster, using potentiometer "T".

OR: Measure the resistance on the old instrument cluster between pins 1 and 18 (ground) and set that value on the new instrument cluster using potentiometer "T".

E15

Replacement of instrument cluster

Instrument cluster 0 263 220 ...



E16

Replacement of instrument cluster

Instrument cluster 0 263 220 ...



After-sales Service

Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

DANGERS FOR ELECTRONIC EQUIPMENT
WHEN FAST-CHARGERS ARE USED

VDT-I-Gen. 040 En
7.1981

The results of recent investigations have led us to point out that damage to electrical components in the vehicle cannot be excluded when batteries are fast-charged or when starting-aids are used. In particular, the control units for Motronic and ABS and the trigger boxes of transistorized ignition systems are most subjected to this danger.

To avoid damage to electrical apparatus the following instructions must be followed at all costs:

1. Do not use a fast-charger for starting the engine.
Starting aids should only be carried out with a second 12 V battery and a starting aid cable.

Please note: On account of the non-uniform demands placed by vehicle manufacturers on electronic products, we recommend that 24 V batteries are not to be used as a starting aid. Follow the operating instructions with the vehicle.
2. Disconnect the battery from the vehicle electrical system before fast-charging.
3. Never disconnect the battery from the vehicle electrical system with the engine running.
4. After fast-charging, tighten properly the terminals on the terminal posts of the battery.
5. When the battery is charged in the vehicle or when starting aids are used, follow the instructions with the fast-charger as well as the instructions of the vehicle manufacturer.

The main cause of the damage to electrical components are high-energy voltage leaks which are brought about by switching procedures and by unintentionally incorrect operation.

The danger increases with an increasingly sulphated battery, since the attenuating effect of the battery decreases.

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N1

Motor Vehicle Service Information
Instrument cluster 0 263 200 ...



Motor Vehicle Service Information

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AUDI QUATTRO

Electrical equipment

VDT-I-AUD 029 En

Change of indicator lamps in cockpit
instrument 0 263 220 008

4.1984

In the event of failure of cockpit instrument 0 263 220 002 it is replaced by version ..008. In this version the trailer turn-signal indicator lamp is replaced by an ABS indicator lamp.

If the failed cockpit instrument had a trailer turn-signal indicator lamp, this must be mounted separately when installing version ..008.

Trailer turn-signal indicator lamp as well as ABS indicator lamp are installed potential-free in the cockpit instrument.

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N2

Motor Vehicle Service Information

Instrument cluster 0 263 200 ...



Motor Vehicle Service Information

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AUDI QUATTRO

Electrical equipment

Change of voltage transformer on cockpit
instruments 0 263 220 001/002,
..005/006, ..007/008

VDT-I-AUD 030 En

7.1984

supersedes edition 4.1984

New technologies have necessitated circuitry modifications to the voltage transformer.

When installing a new voltage transformer, therefore, pay attention not only to its Part No., but also to the modification index (e.g. 02) given next to the FD of the cockpit, see table below.

Cockpit instrument 0 263 220..	Old voltage transformer 2 260 590..	Up to modification index	New voltage transformer 2 260 590..	As of modification index
001	301	without index	301	without index
002	302	without index	302	without index
005	301	04	304	05
006	302	04	305	05
007	301	01	304	02
008	302	01	305	02



In the case of incorrect installation, e.g. new voltage transformer on old cockpit or old voltage transformer on new cockpit, neither the voltage transformer nor the cockpit will be destroyed. They simply will not work.

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N4

Motor Vehicle Service Information

Instrument cluster 0 263 220 ...

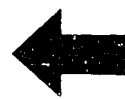


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